

Downtime by Chad Foot slog-1

IF you think your efforts in computing are going unappreciated by the general public, take a look at this letter that appeared in the Eastern Evening News, Norwich:

I think £8 million for a weather forecast computer is utterly scandalous when there are so many serious diseases that have to rely on voluntary gifts just for research purposes. . . . There are surely enough people with corns and bunions which do the job of weather reports just as well and are cheap. (Mrs) D. LANE

Foot slog-2

HERE'S dedication for you. A teacher from Horwich, near Bolton, is going on a one-man sponsored walk from Land's End to John O'Groats to raise the money to buy a micro-computer for St Joseph's RC School where he teaches. John Deady is his name, and all I can say is, more power to your blistered feet, John. I'm sure my employers would be delighted if I went on a sponsored walk to raise money for a new typewriter. Still, teaching in these days of flailing Chancellor's axes calls for an extra special vocation.



Graffito

HO hum. It's the conference season again, and as I sit through lecture after lecture I ponder on how few are original, stimulating, and non-obvious, and how many are none of these. It brings to mind that graffito that I understand (second-hand) is to be seen on the walls of more and more high-class ladies' loos, and that I am beginning to think is a very apt motto for the late Seventies. "You have to kiss an awful lot of frogs to find one prince."

LETTERS TO THE EDITOR

Prestel leads the world by the nose

IT was good to hear from David Butler, in his letter to you (Letters, July 12), that France and the UK are becoming the laughing stock of the viewdata world. We have always felt that there was not enough laughter in computer services, and fun is one of the secret ingredients in Prestel's success — witness more than 100 games, jokes and puzzles already on the system.

But seriously, while I can understand David Butler's desire for a grand Anglo-French alliance to develop and market viewdata on a worldwide basis, I do think he is on the wrong tack.

Viewdata is one of a long and distinguished series of brilliant technical inventions that have been produced in this country. Too often in the past such inventions have languished for lack of energetic commercial exploitation, and have had to go overseas to be properly appreciated. The Post Office is determined that this shall not happen to viewdata.

This country has the skills, resources, and imagination to exploit viewdata effectively, provided that the project is pushed forward now, in a bold and enterprising spirit. This we are doing. We are years ahead of the rest of the world, and have already sold our technology to West Germany, the Netherlands, Switzerland, and the US. We have created, in Prestel, a whole new industry in the UK, providing business for hundreds of firms, including, I am glad to say, Butler Cox and Partners.

Of course we must move towards common technical standards for the various national viewdata services. And we are working intensively not only with the French, but with many other countries, towards this end. But the task is not as simple as David Butler suggests. In the early days of a new service there will be room for different, and genuinely held, points of view on the right technical solution.

And since Prestel, Ceefax and Oracle have become firmly established as going commercial services, we must obviously seek to achieve international standards which are "downward compatible" with these existing services. International committees exist to resolve these problems, and they are doing so.

But please don't suggest that Prestel should become bogged down in grand inter-governmental ventures. It would be the kiss of death. We have moved from the decision to proceed with Prestel (February 1978) to the opening of an admittedly limited public service (March 1979) at about three times the speed of inter-governmental projects such as Euronet. And grand inter-governmental ventures have a nasty habit of losing touch with the marketplace (cf Concorde).

Prestel is an example of Britain leading the world, not only in invention, but also in commercial exploitation. If the Americans David Butler meets find this funny, they must have a peculiar sense of humour. The Americans I meet are amazed (and frankly a bit embarrassed) to find poor old Britain leading them by the nose into the information society.

Dr ALEX REID
Director of Prestel
London.

NCC and the Filetab story

FROM 1968-1972 I led the NCC team which specified and produced the Filetab system and I must put the record straight regarding the development of this package, for I fear J. E. C. Cartwright's memory is at fault (Letters, July 5).

Filetab is based on the NITA package which was designed, written and sold by Tom Barnard in 1966-67 and which is still in use alongside FILE. Because of a mutual interest in the use of Decision Tables as a programming language, when Tom

joined me at NCC early in 1968 he and I specified the Filetab system and persuaded NCC to enter the field of software production, a decision which has been beneficial to the computing community and NCC.

Once it was successfully established, many people have claimed some involvement in the design of Filetab. Certainly, in the later 1960s Bob Johnson and his team at E. A. and S. Robinson in Bristol produced a specification for a parameter-driven reporting package. How-

ever, Filetab was already available and being sold for ICL 1900 machines and Bob contacted me at NCC when he learned that a version was being developed for the IBM 360 series.

Because we could not give priority to Robinson's requirements, Bob commissioned a software house to produce a tailor-made package. I wonder what happened to it?

Mrs M. PHILLIPS
Warrington, Cheshire.

P. D. MADDISON
13 Westridge Road,
Portsmouth,
Southampton,
Hants SO2 1HP.

more to the needs of our members, and we organise local talks of general interest. We meet on the first Wednesday of each month, restarting in October, at the Medical Sciences building, Bassett Crescent East, University of Southampton, at 7.30pm.

I would like to use the columns of Computer Weekly once more. I wish to trace sources of two items of equipment suggested to me:

(a) slow, small card readers capable of being linked to teletype lines, and

(b) a card punch other than the older button type or the 020 keyboard type.

I remember some years ago seeing literature on a punch that could handle one card at a time.

M. G. PAUL HUTCHINGS
79 Lantwood Road,
Whitlock,
Pontypridd,
Mid-Glam CF37 2EP.

YOUR front page article, "ICL clears the way to 2900" (CW, July 19), does not go far enough in stressing the true significance of SME (Simulated Machine Environment).

SME is not merely concerned with such a narrow field as conversion; rather it is about active transition from a 1900 (or DME) to native 2900.

The concept of SME is that of building an image of the VME user interface (hence "Simulated") within a 1900 environment. This means the co-ordination of previously free-standing products, for programs and data conversion, into an integrated environment (VME/BSCL under George 3).

The benefits of this approach are that all new work can be written to 2900 standards in a form which can be run under

Readers thanked

MAY I, through your columns, thank Computer Weekly and all your readers who responded to our appeal for a Braille online terminal (CW, July 5)? As a result of their help, and also the generous offer of Rolo-Royce at Bristol and the Cambridge University Computing Service, our students will have interactive access next year.

I. R. MACCALLUM
Senior lecturer
Dept of Computer Science
Essex University

Fair comment?

IN "Gill's Mythology" (CW, July 5), Figure 1 contains a sample of a design specification. M.T.X.T. Comments shall be made for at least 30% of source lines on avg.

Would not a more useful specification be M.T.X.T. The source shall be of sufficient clarity that comments are necessary on less than 30% of the lines on avg?

Dr A. N. WALKER
Dept of Mathematics,
Nottingham University.

A place for Control Theory

MAY I applaud Tom Gill's description of the way in which he specifies goals for maintainability, and monitors the attainment of these goals? At the same time, I do hope that his readers will realise that this is only one area among many where the specification of goals and monitoring methods would lead to more satisfactory computer systems.

Control Theory has been accepted for decades in many engineering applications, and surely has computer systems design. Perhaps one could do a top-down design using a methodology such as Michael Jackson's. For each process on the structure chart, input and output are specified. This is, of course, the desired output, in goal. The final stage would be to

decide on methods of monitoring the output to find out what corrections should be applied.

By "output", I mean, for example, a valid record from data-vet, an updated version of the file, a continuous response to queries on a database, a satisfaction with the computer system. These are at different levels of one top-down hierarchy, viz the theoretical design. But systems, and particularly those which are to be applied to other types of goal, which "maintainability" is. The major difficulty is that this would appear to be the end of suitable methodologies.

Mrs LYN ANGL
Lecturer in Computing
Polytechnic of the South Sea
London SE1 8AA.

More help sought for school work

I WOULD like to thank all those who replied to my request for help and advice on computing in schools (Letters, July 5). I have received much useful data on microprocessors and minis for use in the school where I teach, and advice on useful publications and organisations. I am very grateful.

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DHSS in moves to automate benefits

THE Camelot project for automating payments of incapacity and supplementary benefits, for which ICL has been awarded the pilot system contract (CW, August 2), is the latest in a long line of attempts by the Department of Health and Social Security to automate these applications.

Incapacity benefit is believed to be the new euphemism for sickness benefit. Attempts to automate such payments were made and discontinued five years ago (CW, August 15, 1974).

Camelot, Computer Aided Mechanisation of Local Office Tasks, is a development of an idea which was being pursued at that time. This involved installing local computers to serve one or more payment office. The plan now is to put one twin computer system into each of the 12 regions.

The contract was a good one for ICL to win, since it was placed after an open tender in which a large number of companies competed, and indicates that ICL is able to win public sector contracts even without the protection of the single tender policy.

The pilot involves two twin 2950 installations, but if successful it will be applied throughout the 12 DHSS regions, and require a total of 28 2950s, 28 CR80 front end processors from Christian Rovsing of Denmark, and 500 7502 cluster terminal systems with a total of 2,500 VDUs.

The pilot project involves installation in Reading for delivery at the end of the year, and a second, in Bath for the live trial, one year later.

It is planned that the Bath system will serve five local offices equipped with 7502s, but it will have to be able to simulate operation with 228 terminals attached.

The system in Reading will be used for software development. Underlining the venerable ancestry of the project, the operating system to be used is not VME/K but DME. There are

Security worries

WORRIED about security, the US Treasury is taking its payments system, which transfers \$10,000 million weekly to more than 100 government agencies, off a Honeywell 6060 mainframe, and building a dedicated system using a dual Tandem configuration. For added security it is to be installed in a vault.

The Federal Treasury has been concerned for some time that, because of the variety of applications running on the Honeywell machine, it is difficult to control the number of people who could have access to the Treasury Financial Communications System. Designed for ultra reliable working, the Tandem NonStop 18 computer systems are sold with a minimum of two processors.

Mrs LYN ANGL
Lecturer in Computing
Polytechnic of the South Sea
London SE1 8AA.

Over 200 line up for Computastars finals

THE line-up is now complete for the finals of Computastars to be held at Crystal Palace on Saturday, September 29.

More than 200 computer people will be entering in a variety of both team and individual events, details of which will be released on the day.

Supporters are welcome, and advance tickets cost 60p per adult and 30p per child and can be obtained by filling in the form below. Entrance charges on the day will be 80p and 40p respectively. Teams are:

MEN

East Anglia: Thomas Cook, British Steel, Norwich Union and J. H. Minc.

Midlands: Selcon, Data Sciences, Peterborough Data Processing and Thorn Electrical.

North East: Compuser, Empire Stores, Rowntree Mackintosh I, Rowntree Mackintosh II and Rowntree Mackintosh III.

North Thames: CMC, Gordon & Gotch, Heinz, London Transport and Midland Bank.

North West: Littlewoods.

East Anglia: Norwich Union, Provident Mutual and Thomas Cook.

Midlands: Data Sciences, Peterborough Data Processing, Thorn Electrical and Selcon.

North East: Midland Bank Operations, Provident Management Services, Rowntree Mackintosh I and Rowntree Mackintosh II.

North Thames: Case, Lola, London Transport I and London Transport II.

North West: British Nuclear Fuels, Liverpool Daily Post and Echo, Midland Bank (NWCC) and Woolworths.

South Thames: Commercial Union, Legal & General I, Legal & General II, London University and Segas.

South West: EMI I, EMI II and Rank Toshiba.

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Racal-Milgo third in survey

UK owned Racal-Milgo ranks third in size by turnover in the Top 60 data communications manufacturers in the US, according to a survey published by the US magazine Datamation.

If the figure is combined with Racal-Vadic, ranked 18th in the listing with a 1978 turnover of \$12 million, then Racal's 1978 turnover of \$76 million is second only to IBM with \$144 million from data communications. This represents less than one per cent of IBM total turnover on all products.

Banks find \$1,500m credit for IBM

IBM's borrowing requirement has been met by 37 banks only three weeks after the company announced that it was seeking lines of credit totalling \$1,500 million (CW, July 19).

It is the first time for 12 years that IBM has been unable to finance its future business out of its own resources. The company has not said what it needs the money for, but it is thought to be needed for expansion of production facilities for new products, notably the 4300.

There are strong indications

that demand for this is way beyond the company's expectations.

The last product for which IBM seriously underestimated demand was the 3030 series. Following the problems created by that, T. C. Papes, who headed the systems products division which has since been split into two, was transferred to an administrative position.

The men in the hot seats this time round are senior vice-president Paul Rizzo, who heads the data processing products group and, J. D. Kuenier, who is president of the new systems products division, which embraces the 370 series up to the 148, and the 4300 line.

Amdahl link-up

THE job processing system being developed by Brook Street Bureau (CW, July 28) uses a Datapoint 5500 for data collection and input to the BOC Data-solve Amdahl 470V/6. The processed information is then fed back to Brook Street where job matching is carried out on Delta Data 4000 terminals, of which eight have been installed so far.

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MICHIE'S PRIVATEVIEW

AI comes of age . . .

THE microelectronic revolution is usually perceived in terms of whatever is most immediate — to the neglect of more fundamental implications.

Every radical new technology shows this pattern. The significance of steam power was at first seen only as a cheaper way of pumping water out of mines.

When the age of transportation dawned, the use of the locomotive engine to carry passengers at speed was denounced as medically dangerous.

We even find in Samuel Butler's social fantasia "Erewhon" the new "vapour engines" depicted as taking over the world!

The historian will look back over the early years of machine intelligence. What will he identify as the equivalent to Stephenson's Rocket? A strong candidate will be the Mycin program, developed at Stanford Medical School, particularly in its domain-independent Emycin form.

Appropriately, the opening lecture at last month's AISB

Summer School on Expert Systems, held in Edinburgh, began with one of Emycin's latest success stories: an Expert System for interpreting tests of lung functions.

The program, Puff, is now in routine use at the Pacific Medical Centre in San Francisco.

The lecturer, Dr Edward Feigenbaum, heads the Heuristic Programming Project which he founded at Stanford University in the mid-1960s. He took his audience on a swing through the successes of 14 years' patient dedication to the new craft of knowledge engineering.

Feigenbaum is uniquely equipped to summarise its emergent principles and his tour of selected case studies set these principles before an appreciative British audience.

The composition of the audience itself marked a new departure. No fewer than 30 of the 100-plus participants came

from industrial and government agencies. Artificial intelligence is entitled to celebrate its coming of age when it can show the capability of earning a living. At Edinburgh, it was abundantly plain that this moment has come.

The first afternoon witnessed a presentation by Ray Carhart, originally one of Feigenbaum's Stanford team, now a member of Lederle's industrial laboratories in New York State.

During a year sandwiched between two appointments, Ray worked in my Edinburgh group to refashion the experimental chemistry program, Congen, into a practical tool.

He was able to report the adoption of his new-style Congen by industrial scientists at Shell's Sittingbourne research centre.

But let us not go overboard about applications. The smell of practical success can have

unsettling effects. At the first whiff of technological benefit, research sponsors show inclinations to argue that basic investigations can now be let go hang.

The real situation is quite opposite. Never has fundamental inquiry been more acutely needed than when applied successes begin to expose our ignorance of the fundamentals of cognition.

It is from these fundamentals that man-machine consultation systems — if they are to be cheap to make and safe and easy to use — must be structured.

Richard Young, of the Applied Psychology Unit at Cambridge, argued with illustrative variations that the construction of expert systems in the form of pattern-directed rules — now the dominant practical methodology — intimately parallels the cognitive representations of the human expert.

A separate and deep-seated need for basic research arises from the limited nature of Expert Systems as we know them. Knowledge engineering has so far confined itself to the implementation of such mental skills as can be completely embodied in pre-stored patterns.

We see this kind of problem-solving in human experts whom age has robbed of the power to innovate and learn. Yet these ancient, hide-bound and blinkered, can still surprise by high performance when confined to familiar ground. Eventually, however, we would like to engineer non-sensitised intelligences!

Steps in such directions were described by Ivan Bratko and Tim Niblett of Edinburgh, who reported on a chess program able to generate new strategies through conjectures and refutations and by Ross Quinlan of Sydney, Australia, who described machine learning in the context of database compression.

The second morning belonged to logic programming, a fad of exclusively European origin destined, in my opinion, eventually to carry all before it. J. A. Robinson himself, who started it all with his 1965 paper, "A machine-oriented



logic based on the resolution principle," opened with a tour de force which combined sparkling clarity with depth, his mirrored his own tutorial masterpiece "Logic, form and function," published a few weeks earlier.

Different incarnations of logic programming in the language Prolog were described respectively by David Warren of Edinburgh, and by Clark and McCabe of Imperial College, London.

Substantial detail will be available in the proceedings of the Summer School to be published later this year. I shall contain for a future column my reactions to the Summer School's second half.

REFERENCES

Logic, form and function, by J. A. Robinson, Edinburgh University Press, 1978.
Expert Systems in the microelectronic age (proceedings of the 1979 AISB Summer School) edited by Donald Michie, Edinburgh University Press (to come).

PROGRAMMER NOTES

Ultimate liability for mistakes

IT is all too easy, when involved with the intricacies of a program, to forget that one's code will ultimately take its place in a demanding and dangerous real world.

There is a temptation, for example, to attach more importance to the program structure and logic than to the numerical results. The former are, after all, the more interesting and challenging aspects of the task.

Yet in the long run it is mistakes in the latter which will be most visible to the user.

In many cases, the incorrect placing of a decimal point will be detected quickly. In some, however, such as an error routine in a flight program, it may not. And the consequences could be very serious.

Similar considerations apply in several other areas, including testing in general and the documentation of program changes.

With the rapid growth of computer applications and increasing dependence on computer systems in general, the potential repercussions of any type of program error must be growing likewise.

But there have as yet been no indications that the ultimate responsibility for a software error could be laid at the feet of the programmer — or not in this country at least.

A situation has, however, developed in the US in which a negligent programmer could be held to be criminally liable.

The circumstances under which this could arise are outlined in the latest issue of Computer Law and Tax Report, a newsletter published in Boston as an "intelligence service for computer users and their professional advisers."

Under the headline "Can Programming Error Create Criminal Liability?" the author points to recent regulations

passed by the Food and Drug Administration and relating to the adulteration of drugs: "current good manufacturing practice."

Among the regulations are rules on the use of computers in the manufacture and process of drugs.

They call, for example, for input of formulae and records or data into the computer to be checked for accuracy; for the maintenance of back-up files and hard-duplicates; and for appropriate controls to protect programs and control logs against authorised update.

A manufacturer who fails to enforce these procedures will be open to prosecution, notes the newsletter.

So, it argues, will the analyst who ignores these controls or the programmer who fails to document his program.

If the drug turns out to be adulterated, failure to comply with the checks and balances is evidence of negligence.

In its editorial comment on the above, the newsletter remarks that it is the responsibility of DP managers to make sure that new regulations which affect it have been communicated to the DP department.

Yet many programmers would surely want their sources of information on regulations to be affected in some way. And, to take it one step further, would they not want insurance — against liability held by doctors — against potentially costly legal action?

Programmers have shown little interest in publishing their trade secrets on a regular basis. The law, could it be that the publication of ultimate liability mistakes is the only way this direction

SOFTWARE FILE

ICL tops out its database range

WITH the release of IDMSX — a facilities-rich enhancement of its 2900 database management system IDMS — ICL is arguing that its data management software is now at least as good as any in the world. The new software, which has been at test sites for a year, becomes generally available with release 5.3.2 of VME/B.

The main intention of IDMSX is to offer users more options providing several alternative mechanisms where IDMS provided only one or two. It therefore stands in the same relationship to IDMS as IDMS does to IDMS-E, the subset form announced earlier this year (CW, May 31 and June 7).

High on the list of new features is the option to build inverted file structures. The principal file organisation supported by DBMS such as Adabas, this option was not previously available in IDMS, which is network-oriented.

IDMSX supports three file inversion mechanisms: standard record-type inversion using logical keys; indexed sets based on pointer arrays; and record chaining, which is most efficient for short sets.

Another IDMSX innovation is a sequential placement mode. Joining the existing random, via set, and direct modes, it has the same characteristics as indexed sequential organisation, offering the chance to optimise for sequential access.

Also addressing DBMS per-

formance is the new ability to hold subsets of a database in virtual storage. Any convenient subdivision of a database can in effect be held in main memory, eliminating the need for disc access to frequently referenced data such as tax tables.

Among other enhancements are further recovery options, aimed mainly at speeding recovery of large databases; the option to set up a temporary file of before-look images; and a number of enhanced utilities.

Nearly all the enhancements stem from requests from the existing IDMS user group, which ICL regards as active and very knowledgeable. There are currently over 130 IDMS users on 2900 and about 50 users of the data dictionary system, DDS — the other main component of ICL's data management offering.

DDS has matured rapidly since its general release two years ago, being seen by both users and ICL as the hub around which DP developments must revolve.

Unlike IDMS, it was implemented by ICL from scratch and it therefore differs considerably from Cullinane's own data dictionary. In its active role, for example, it can generate schemes and record descriptions directly whereas the Cullinane software re-uses the IDMS directory for this function.

DDS uses IDMS as its file handler so that aspects such as recovery — a very strong fea-

Confusion for users over which 290X op system will be used

THE good news for ICL 290X users is that a new operating system with integrated teleprocessing capabilities is on the way to see them into the 1980s.

The bad news is that a controversy has arisen over which of two products, Ice or Supremec, is to be offered and, once again, the poor bewildered user is left guessing.

There are four existing operating systems available on the 2903, 2904 and 2905. They are: Exec 1, which runs on all but the cut-price models; Exec 2, which runs on the 2904/30 (CW, March 23, 1978); and Exec 3S, which runs on the 2905 (CW, April 26) and includes microcode assists for RPG II and disc accesses.

All are compatible supersets of the one below, and are based on the Exec used on the small 1800s. Internally they are collectively known by ICL as Emoc.

No one can deny the enormous success of the 290X line, which took ICL itself by surprise. It turned out to be the right product at the right time, and the success seems to vindicate the choice of operating system.

Nonetheless, it is a predominantly batch operating system, and the demand today is mainly for transaction processing. The 290X represents the same half-way house between the two as IBM's System 34 compared with System 32.

IBM has, however, decreed that the future for System 32 is System 38, designed for transaction processing and database applications.

ICL has long been aware of the need for something comparable and was given a grant by the Department of Industry to invest in deciding upon a new operating system.

One of the criticisms of ICL in the past was that, unlike IBM, its resources were so thin that it could only invest in one solution to a particular problem, and if the one chosen turned out to be a dead end, the company would be in trouble.

ICL is a big company now, research and development budgets are a little fatter, and two alternative projects have been under way for some time to develop the appropriate operating system.

One, code-named Ice, Integrated Executive, is completely new, the other, code-named Supremec, is defined as a "design concept for the future of Exec," essentially major extensions of Exec to meet the future requirements of 290X users.

The controversy has been whipped up over the fact that now there are two apparently viable options open to ICL, one will have to be dropped.

It appears that the latter, Supremec, is presently in the ascendancy, and remembering all the problems ICL had in getting VME/B and VME/K right, one can understand why.

Whichever route is chosen, users should be able to rely upon almost total compatibility with the existing Execs. If this proves not to be the case, ICL will put its jeopardy all the power future business of its coveted 290X user base.

Lloyd's contract

LOGICA has won a contract to extend the ships database maintained by Lloyd's of London Press. The main enhancement will be the incorporation of ownership details linking the 33,000 vessels currently held in the database to about 12,000 ship-owning companies.

The PDP-11/70-based system is used to produce publications such as Lloyd's List, Lloyd's Shipping Index and Lloyd's Voyage Record.

IBM version

PACKAGE Programs has announced an IBM System 34 version of the MMS general ledger and financial reporting system. Written in Cobol, it requires a 48K System 34 and costs £10,500.

First fruits

SALES, purchase and nominal ledger, and payroll software for the Adds System 70 and 75 have been among the first fruits of Gemini Computer Systems' new microcomputer division, Gemini Microsoft, based in Manchester.

Real time extensions on Basic interpreter

A BASIC interpreter, including real time extensions for such applications as instrument control, has been developed by Research Resources Ltd of Welwyn Garden City. It is currently available for the South West Technical Products 8800 and for the CT-82 graphics VDU.

A version of the interpreter, which is called LabBasic, is under development for the Commodore Pet and the company is also working on a compatible compiler that will

generate EPROMable machine code.

Among LabBasic extensions specifically designed for simplifying the interface to external equipment are Sense, Flip, and Delay commands for the control of input devices; commands to change the state of output lines; and facilities to generate pauses of known length.

The system also includes an interrupt clock. The two current versions of LabBasic are priced at £25.



FEELER gauges are "blades" of various thicknesses with which the engineer or mechanic can measure the gap between two components. They can be attached to a key-ring, and used singly, or held adjacent to each other in blocks of two or more.

This week's problem is to work out a circular array of five

"integer" gauges, such that all integer totals from 1 to 21 may be measured with the technique already described. The first question is "Which five numbers will do the trick?" and the second "Where precisely must they be placed round the key-ring, in relation to each other?" See page 45 for solution.

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Computer Weekly is holding its fourth annual Ball. Last year nearly 700 people attended what has come to be regarded as the computer industry's big night out.

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OP SPOT

College prepares school leavers for job market

AS the computer industry grows, more and more sites are having difficulty in finding experienced and qualified staff.

To overcome this problem, many are now looking to recruit staff at junior level and fill the senior positions from within the company.

Colleges of further education have a big role to play in this context. In fact, the main aim of "vocational further education" is to prepare young school leavers for the job market, according to Angus Redpath of Annesland College in Glasgow.

Scottish Business Education Council.

The course is made up of five subjects: operations, programming, data processing, computer theory and accounts.

He goes on "While the course is primarily concerned with computer operations, we are aware that employers want staff at the junior or trainee level, who are not over-specialised in operations to the exclusion of all else."

So the students are trained up to junior operator level although, according to Redpath, they are capable of carrying out most operational duties as soon as they leave the college.

To gain practical experience of operations, they spend at least two weeks at one of the local sites.

"This is an intensive part of

the course and we are making efforts to extend it. The good relations we have built up with companies over the years have helped towards a clearer understanding of mutual needs and requirements."

Throughout the year, the students take part in college-based projects which are intended to be of practical benefit. "The main reason for their inclusion in the course is to knit together the aspects of computing dealt with under the various subject headings."

"This type of work has a direct bearing on their studies and helps to maintain a high level of interest and motivation during a very busy year."

Although the college does not have an in-house mainframe, its computing facilities are more

than adequate — a Commodore Pet, data prep equipment, and links to a Prime 400 and a DECsystem-20.

"The net result is that the students are kept very busy from day one of the course. This is no soft option as an alternative to work."

Redpath says that the demand for the college's students is so great that about 90 per cent of them have positions in the industry before they have completed the course.

He goes on, "Feedback indicates that operations is not only a worthwhile career in itself but that the opportunities of moving into areas such as programming and analysis are good. The majority of the students graduate from their initial appointments to higher posts within 18 months to two years."

By Bernard Allen

Terminating the printer under Univac OS

AS pointed out by Colin O'Keefe of British Airways' London site, IBM OS operators should always stop the printer before cancelling a job at output stage (Op Spot, June 28).

And now Alan Winger of BP Oil in Hemel Hempstead, gives similar advice in relation to the Univac OS 1100 environment.

He comments, "Univac operators, particularly trainees, should also take care when cancelling a job which is in the process of being printed. Instead of Cancel, we use a 'SM device E' keying where E stands for error."

Winger also refers to two other commands Univac OS 1100 operators use to control the printer: "SM device T", to terminate the device, and "SM device I", which stands for initiate, or start it.

"Whatever the reason for terminating the printer, the operator must take care to re-align the paper before re-initiating the device. Otherwise, the next print-off will be mis-aligned."

Ex-TOPS students happy in their work

FORMER TOPS student Steve Ward (Op Spot, July 7) has a chance of moving up to the position of senior operator, just eight months after completing his operations course at Borehamwood College in Herts.

Steve, who works at Jermyn Industries' site in Sevenoaks, Kent, told me, "Two of our operations staff gave me their notice recently; one of them is a senior operator, and the position is to be filled from within the department."

There are three candidates for the position, and the operations manager is to work with each of them, to find out who is best suited for promotion.

Dave Townsend, another ex-TOPS student whose progress we have been following, is

"working harder than ever" at that's the way he likes it.

An operator at the First National Bank of Chicago in London, Dave said, "I get it everything, from running the systems to using the IBM 3080 programs. It suits me because I learn more and don't get bored."

Dave attributes the reason mainly to the fact that he is employed at a small site. It points out that recent developments have added to his duties.

"Until recently we had a team of five operators, two on day and three on evenings, but two of them left and the company has decided not to replace them."

"In addition, the workload is increasing all the time — much, in fact, that we plan to install two new disc drives very soon."

Tidiness is functional — nit-picking is not

VIEWS on keeping the computer room clean and tidy vary considerably from one installation to the next.

At one site I visited, little attention is paid to the matter, with the result that tapes, discs and boxes of stationery are kept on the computer room floor — due mainly to a lack of storage facilities in the area and not the fault of the operators.

A rather different approach is used at another installation. I know of. At the end of the night shift, the operators are expected to clean all work surfaces and VDU screens.

Now vacuum-cleaning printers and wiping print trains is quite enough, but at this site the operators are expected actually to remove the trains and open up the back of the units for hoovering.

One bright morning the manager sauntered into the printer area and took it upon himself to inspect the units, one of which he discovered was a bit dusty. He immediately seized on this and ordered the operators — who had just completed a 12-hour night shift — to clean all the printers again. (If ever an operators' union was needed, it was needed on that occasion.)

It is obvious that neither site puts the right emphasis on com-

puter room tidiness. And it is important, for an untidy area is detrimental to efficiency: it makes operating a precarious occupation. But it should not be taken to extremes.

From the efficiency viewpoint, staff should clean up as they go along, returning media to the appropriate size rack as soon as they are no longer required by the system.

Consider, for example, a set of jobs which uses a lot of tape, some of which are needed once per run, while others are required several times.

As each job finishes, it is too easy for the operators to adopt a "put them away for a minute" attitude. I have seen this myself. But in the long run such an approach makes the task more difficult.

The operators should find use of the run documents to find out what tapes are needed more than once and keep them by the console. The volumes should be returned to the tape racks as soon as the system has finished with them.

Regarding the maintenance of peripherals, it is important that they are cleaned regularly to prevent read/write errors and poor print quality. And that's all.

Hardcopy log commands

THE IBM OS operator uses two commands in relation to the system hardcopy log: Log and WriteLog.

Log is used to record messages on the hardcopy and has the following command format:

L 'Message Text'

Typically, the operator will record information relating to job cancellations and changes in

the state of the system, such as when one or more tape or disc drives are under service.

And, provided that WriteLog is used to print the hardcopy log, the information can be used by job controllers as a means of dealing with enquiries. WriteLog has the following format:

W Output Channel

MICRO NEWS

By Martin Banks



Meter reader

THE M50 hand-held data capture terminal from UCSL Microsystems, seen here in the final stages of assembly at the company's Bournemouth facility, is now being offered to gas and electricity authorities for meter reading applications.

This is the market being investigated by Plessey with a specially developed portable system (Micro News, April 28).

UCSL estimates that the European market for such terminals could be as high as 25,000 units.

In operation, each M50 would be loaded from an authority's central computer with all information necessary for the meter reader's "walk". The reader, at each reading point on the walk, enters the meter reading into the terminal's memory. At the end of the day, this data is read back into the central computer.

AMD-Zilog race for Z8000 support

SOMETHING of a race is building up between Zilog and Advanced Micro Devices as to which will be the first with the most in supporting the Z8000, 16-bit microprocessor.

Following the recent announcement by AMD of three new peripheral chips for the processor (Micro News, July 19), the company has announced a new development system that will not only emulate the Z8000 prior to its availability, but will also allow both hardware and software development on the Intel 8080 and 8085 processors, as well as the Zilog Z80, and the Z8000 as it becomes available.

To complement this, AMD is also planning to introduce a Z8000 evaluation board which, in addition to operating in stand-alone mode, can also be plugged into the new development system. Both are expected to be available by the end of this year.

Zilog, for its part, has just introduced a single-board Z8000 development module, but a full development system is not expected until early next year. Its introduction, however, is likely to be followed later in the year by a general-purpose computer system, which is expected to employ a multiple processor configuration.

The AMD development system, known as the System 8/8, in fact uses an 8080 processor chip. The minimum configuration, costing £5,095, includes 32K bytes of RAM, dual floppy disc drive offering 512K bytes, one RS232 port and six parallel ports.

The minimum software is an 8080 macro assembler and a Z8000 translator and macro assembler. This latter is currently suitable only for software development as it does not have sufficient operating speed to emulate properly a hardware configuration system. There is also a text editor, link-loader and disc operating system.

Options for the system include memory expansion, Z80 and 8085 CPU cards, in-circuit emulation boards, and a hard disc system. Software options include Basic, Fortran, Pascal

£20 fee for Pet repairs

COMMODORE Pets are now being repaired for a flat fee of £20 plus the cost of parts, by Luton-based Pet distributor Fisher-Woods.

The service is open to all Pet owners, not just those originally supplied by Fisher-Woods.

It is hoped that an automatic test system based on a Pet microcomputer will be up and running by this week.

and Cobol high-level languages, and macro assemblers for the optional CPUs.

For AMD, however, the big one is likely to come early next year with an upgrade of System 8/8, known as System 8/16. This will incorporate a Z8000 CPU board as standard.

Its evaluation board, costing about £700, will include two RS232 ports, 24 parallel I/O lines, 8K bytes of RAM and 12K bytes of PROM/ROM space — 2K bytes of which will be taken up by the monitor. Options for this will include an ASCII line assembler, and a keyboard and 20-character display.

Both Zilog and AMD state that samples of the Z8002 variant of the 16-bit processor

are available. AMD, however, is understood to be contractually obliged, as part of the second source agreement, to wait 90 days from Zilog's announcement of availability before releasing any parts. Zilog claims to have had samples available since March.

The Zilog development module features a Z8002 processor, 2K words of monitor, 16K words of RAM, dual serial interfaces and 32 programmable I/O lines. It is capable of being used either as a hardware and software development unit, or being designed into a system configuration.

Its prime advantage over the AMD evaluation board is that it is available now.

Fairchild's figures leap

WITH over 93% of its shares now bought by Schlumberger, Fairchild Camera and Instrument has announced quarterly financial results that include a 32% jump in sales and a doubling of profits over last year.

Second quarter sales were \$167,986,000, 32% up on the same quarter last year, and 15% up on the first quarter of this year. Profits, at \$12,662,000, were more than double those for the same quarter last year, and a whopping 78% jump on profits for the first quarter of this year.

Figures for the first half of this year show the company with a rise in profits of 83%, to \$19,618,000, on sales that advanced by 28%, to \$313,847,000.

Growing importance of the 16-bit market

DESPITE the fact that the wider word size of 16-bit microprocessors offers designers little intrinsic advantage in the development of microcomputer systems, these devices will assume considerable importance in the marketplace by 1983.

This is the primary finding of a report prepared by Software Technique Inc. of the US, and published in the latest issue of Microcomputer Analysis.

The degree of the importance to the marketplace is estimated in the report as resulting in a 80% annual growth rate in sales of the devices over the next few years, with a share of the microprocessor business rising from 6% now to 23% by 1983.

One of the principal reasons cited by the report is that the 16-bit address bus of the popular 8-bit microprocessors is placing increasing capacity restrictions on system memory. It points to the fact that in the early Seventies, 64K bytes of memory seemed huge.

Now, it is a Megabyte of memory that seems prodigious for microcomputer systems. The report conjectures, however, that by the end of the lifetime of the new 16-bit processors now coming on to the market, a

Megabyte of memory will itself be restrictive.

The reason that these new 16-bit processors offer little advantage is that much of the processing work they will be used for is byte-oriented. The wider word size over the currently predominant 8-bit devices is, according to the report, a positive disadvantage.

This could lead to little improvement in throughput, for if most of the data can be fitted into bytes, half the memory space can become wasted, the wasted area being the high-order bits of the 16-bit word. Certainly more efficient utilisation can be achieved by packing two bytes per word, but this needs the execution of sequential instructions to unpack the bytes on reading.

So, the report suggests, the higher processing speed of the 16-bit devices becomes cancelled out by the increased instruction processing overhead.

The report also presents an analysis of the current and future crop of 16-bit processors, together with an explicitly derived chart of their relative power. Top of the pile, according to this chart, will be the Motorola 68000.

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IDMS is obviously particularly suited to businesses in which a number of different user departments need to look at the same sets of facts from different points of view: good examples include construction, banking and insurance, and production and stock control in general manufacturing. It is simple to use — the language is a high level one based on COBOL. And it conforms to the CODASYL standard.

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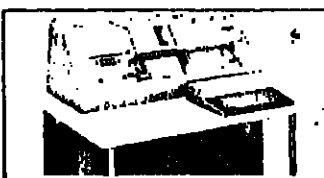
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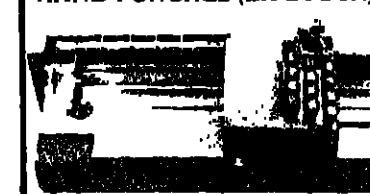
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PEOPLE AND EVENTS

Major changes at Digital Equipment

MAJOR management changes have been announced at Digital Equipment, which include the appointment of UK sales, marketing and CSS managers, and CSS and engineering managers for Europe.

Former UK marketing manager, Tony James has been promoted to sales manager in the UK. He has spent two years as marketing manager at the company's European headquarters in Geneva.

As sales manager, he succeeds Dave Buckingham who now becomes manufacturing, distribution and control product manager for Europe.

Bill Passmore takes over from James as marketing manager. His most recent position was that of central and south-west district manager for Digital. He joined the company in 1971, and was previously with Nuclear Enterprises and EMI Electronics. He is replaced by Frank Turner.

Manager for computer special systems in Europe is Kristoffer Sygel, who will be responsible for the four special systems groups in Reading, Munich, Paris and Stockholm. He was formerly CSS business manager in Stockholm.

Stuart Haughton has become manager of the UK CSS group, based in Reading. His previous experience includes several years with the UK atomic energy authority.

Formerly ESE manager in Reading, Jim Wade has been appointed European engineering manager, and will be responsible for engineering operations in Europe including product development management, product planning, safety standards and the European software engineering group already established in Reading. Dick Davies assumes the role of ESE manager.



TRAINING manager of Redifon Computers, Peter Haddow, is seen here showing a memory board to children from Ifield School, Crawley, who attended a three-day Careers Exhibition at Crawley Technical College. Redifon was among 85 local firms at the exhibition, which was attended by over 3,800 schoolchildren. One of the main attractions for the children was the R850 terminal, which they all had the opportunity to test.

Terry Baxter has joined Euroco Computer Services as systems development manager. Formerly director of Telecom-

puting's system division, he will now be responsible for production of all software products and turnkey systems.

By Judith Morris

BIS prize for student

The BIS Applied Systems cash prize for the best final year project at North Staffordshire Polytechnic has been won by Mrs Diane Blanton. Her project was entitled "The implementation of a natural language processor using compatible semantic derivations".

BIS said that Diane had shown "exceptional merit and effort" in developing her project, in which she produced programs which implemented principal strategies.

Prizes were also awarded to Neil Taberner for practical programming and Michael Ames for the best practical workshop. The awards are made to encourage undergraduates in their practical course work.



Chapman Dumbarton

Peter Chapman has been group manager for Fairchild's semiconductor division, where he will have special responsibility for microprocessor applications technology. He joins the company from IT Business Systems.

Keith Dumbarton has been appointed managing director of Syvace, the electronic systems and components company. He succeeds Roger Cooke, who remains as chairman of the company. Dumbarton joined Syvace as sales director after a time in the industrial sales division of Mullard.

Daniel Weadock, formerly director of operations for ITT Africa and the Middle East, has become group executive for the same area. His predecessor, John Gullifoye, has been appointed president of ITT Europe. Weadock will report directly to James Lester, executive vice-president and a member of the ITT office of the chief executive.

Brian Sear has become manager of venture development, a newly created position with GenRad. He will be involved in developing five-year strategic plans involving identification and creation of new business opportunities. He was previously vice-president and general manager of Fairchild's sentry systems division in California.

DIARY

AUGUST 18-22
Third Rocky Mountain Symposium on microcomputers. IEE Computer Society, Plenary Park, Colorado. Contact: Michael Tindall, Dept of Computer Science, Colorado State University, Fort Collins, CO 80523.

AUGUST 27-SEPTEMBER 2
Trade and technology in orbit. Orb Foundation, Wembley conference centre, Wembley.

SEPTEMBER 4-7
Compeon Fall '79. IEEE Computer Society, Capital Hilton Hotel, Washington DC. Contact: Compeon Fall '79, PO Box 639, Silver Spring, MD 20901.

SEPTEMBER 6
The future of real time languages in process control. BCS Process Control specialist group. Reading University, Reading, 10.00.

SEPTEMBER 10
Database systems and information retrieval. BCS Information Retrieval group. Computer Laboratory, Cambridge University, Cambridge.

SEPTEMBER 11
Performance management. IDPM West London and Oxford branch. Tesdata House, Hatfield Road, Slough, 18.30.
Bar-coding techniques in stock control. IDPM, Hull Crest Hotel, Ferryby High Road, North Ferryby, Hull, 19.15.

SEPTEMBER 11-12
Computing and communications in the 1980s. Martin Simpson Research Associates, Park Lane Hotel, 36 Central Park South, New York.

SEPTEMBER 12-14
Shape recognition and artificial intelligence. AFTEC and IRIA. Toulouse, France.

SEPTEMBER 13
Optimal control of large scale systems. IEE, Savoy Place, London WC2, 00.45.

SEPTEMBER 17
An afternoon with James Martin. IBM CUA and Butler Cox Associates. The Grosvenor House Hotel, Park Lane, London.

SEPTEMBER 17-21
Computer science and law. Course. CREST and SRC. Swansea University, Swansea. Tel: 0792 25878 ext 302.

Civeware File

by Dm

I ONCE BUILT A VOICE-OPERATED STEERING DEVICE.



...FOR MY BIRTHDAY.



...AFTER WE RAN AROUND THE THIRD TIME.



...I'D EXHAUSTED THE 32-WORD VOCABULARY.



AVAST, INDEED!

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TO encourage the growth of manufacturing industry in the Irish Republic, the government has assembled a considerable package

of grants and tax relief. PAUL NORKETT here describes the advantages, which include no tax on exports until 1990, a reduced cor-

poration tax of 10% on profits until 2000, non-repayable grants for site development and tax-deductible grants on the cost of plant.

Tax advantages of running a business in the Irish Republic

THE economic advantages of running a business in the Irish Republic can be summarised in two words: tax and cash. The Irish government has put together a package of incentives that are very attractive.

The capital allowances are not significantly more attractive than UK incentives offered for some assisted areas. The Irish offer 100% first year allowances on the gross cost of plant. This is quite generous if a 50% grant was given — the UK usually deducts the grant from the allowance.

For readers not familiar with

The big incentive is the non-repayable cash grant towards the costs of site development and purchase of fixed assets.

these terms a few simple figures may help to illustrate the point: suppose a company buys £100,000 of machinery and secures a 30% cash grant. In Ireland the £100,000 may be deducted from the first year's profits, whereas in most UK-assisted areas, if a 30% grant was obtained, only £70,000 would be deductible when calculating taxable profits.

Dividends paid to overseas corporate or individual shareholders will be fully exempt from Irish tax, and there

are no withholding taxes. Ireland has double taxation agreements with many countries including the UK, the US and most of the EEC. This means that in many instances profits repatriated from Ireland as dividends will be either wholly or partially exempt from tax in the country of receipt.

The big incentive is the non-repayable cash grant towards the costs of site development and purchase of fixed assets. If a company was considering a factory in the western half of the Republic, then up to 50% of the fixed investment costs would be paid by the government.

In these matters the government appears to be capable of acting quite quickly. For example, the DeLorean deal for manufacturing the DeLorean sports car was a £85 million investment package and was completed in 45 days. The deal included a significant subscription for government shares.

Once the factory has been set up there are additional grants available of up to 35% for the fixed costs of expansion and modernisation. There are also subsidies for in-house research and development programmes. The training grant is another useful benefit. Grants are paid

towards the cost of training programmes for workers in new industries, for sending personnel abroad for training and for hiring training consultants.

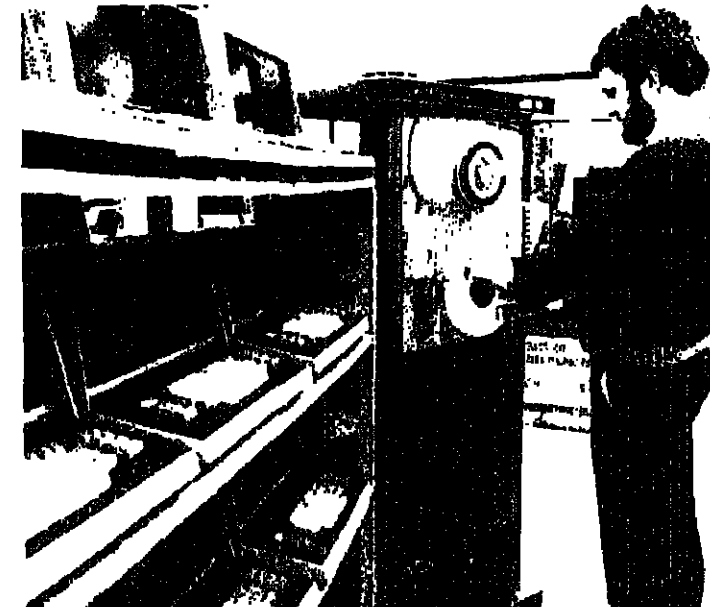
In addition to government grants there are also facilities for raising capital through private and State-sponsored finance houses.

For exports, credit insurance covering commercial and political risks is provided by the government. This enables export credit finance to be obtained from the banks at a preferential rate.

The financial and fiscal ad-

Dividends paid to overseas corporate or individual shareholders will be fully exempt from Irish tax, and there are no withholding taxes.

vantages of setting up in the Republic of Ireland can be summarised in a simplified example. Assume that a minicomputer manufacturer has designed a product with proven market potential. To set up production the company needs 50,000



The town of Ballincollig in County Cork is the location of the Data 100 plant that builds most of the equipment sold by the company in Europe. The main product is the Keybatch multi-terminal data entry system, one of which is seen here being checked out. The Irish plant was opened by Data 100 four years ago and now employs more than 160 people. Future products to be built there could include the Sycon line of intelligent terminals, because Sycon's Canadian based parent, Northern Telecom, now also owns Data 100 (CW, December 7, 1978).

square feet of light industrial space, £50,000 working capital and £500,000 fixed capital. It expects to employ about 50 people. Sales expectations are: year one, £500,000; year two, £1 million; year three, £2 million, with a constant 30% before tax net profit.

If the company wants to set up in the UK, the two main problems are finding the right location and financing £500,000.

There may be some difficulty in getting finance on realistic terms because of the financial institutions' apparent reluctance to back technology. However, assume finance is arranged at an average cost of 20% and factory space at £3 per square foot. Taking these simple figures and making some fairly crude calculations, the three-year aggregate after tax profit would be about £810,000. The main de-

duction is the cost of finance. There would be little UK tax payable in the first two or three years because of the capital allowances and stock relief.

To make a simple comparison for the same set-up in Southern Ireland requires a broad-brush approach on comparability of locations.

Assuming the sales forecast and production capability would be the same as in the UK, the after-tax profits would be higher. The difference arises from investment grants, cost of factory space, and finance. If a 30% grant was allowed on the fixed investment and balancing finance obtained at 12% with factory space at £1.50, the three-year aggregate after-tax profit would be £1,229,000.

The tax advantages would start to show after the first three years.

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28%

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US Department of Commerce statistics for the period '74-77 show a 28% average annual return on investment for US manufacturers located in the Republic of Ireland — more than twice the European average.

IDA Ireland
The Irish government's industrial development agency has offices in London at 58 Davies St., London W1Y 1LB. Telephone 01-629 5941.

IDA Ireland also has offices in Dublin, Amsterdam, Paris, Cologne, Stuttgart, Milan, Copenhagen, Madrid, New York, Chicago, Los Angeles, Houston, Toronto, Sydney and Tokyo.

NEWS IN BRIEF

Honeywell UK restructures

THE UK operations of Honeywell have been restructured into two subsidiaries under a holding company. The existing Honeywell Information Systems, headquartered in Brentford, continues unchanged, but the four control divisions have been formed into a second subsidiary, Honeywell Control Systems, headquartered in Bracknell.

Honeywell Ltd, which formerly embraced the control activities as well as being a holding company for the computer business, now becomes only a holding company.

Burroughs booms

BUSINESS is booming at Burroughs, with half-year net profit up 22% at \$111 million on turnover up 16% at \$1,277 million. Sales were the dominant revenue generator, up 19% compared with the same period last year, while rental and service business rose 13%. Orders in hand worldwide stood at a record level at the end of June.

Cheaper Flexlease

ATLANTIC Computer Leasing has announced price reductions on its three and four year Flexlease packages for new and used IBM 303X systems. The charges for a three year Flexlease are down by 10.5%, while the cuts on four year leases are down by either 5.5% or 4.5% depending on whether the Flexlease allows the customer to upgrade his machine after three or four years.

Tymshare profits

TYMSHARE, the big US based time sharing bureau, has announced that its turnover in 1978 was \$149.0 million, 47% up on 1977. Pre-tax profits came to \$19.4 million in 1978, a 23% increase on the previous year. The company's UK subsidiary chalked up sales of £12 million and pre-tax profits of £105,000 in 1978 compared with £625,000 and £41,000 in 1977.

Tape subsystem

DIGITAL Equipment PDP-11 computers based on the Unibus can now use a tape subsystem from DEC that provides 1600 bps phase encoded recording and read/write speeds of 45 inches per second. Called the TS11, the system includes a microprocessor-based format/controller and costs £8,708 and £9,686, for rack and cabinet mounted versions respectively.

Printer price cut

PRICES of the AJ860 and matrix printer terminal from Anderson Jacobson have been reduced by up to £200. The 60 cps version now costs £1,745, while the 120 cps model is now priced at £1,945. One reason for the cuts, according to AJ, is the strengthening of the pound in relation to the dollar.

Bus cards go IBM

WITH the number of passengers buying the cheap rate Travelcards for bus and transport increasing at the rate of 150,000 a year, the West Midlands Passenger Transport Executive has decided to install an IBM Series 1 system to handle applications and issue embossed plastic cards.

First sales

MSA's general ledger system is being installed by Sun Alliance Insurance Group in one of the first sales to be reported by the company since its UK launch (Software File, March 22). Valued at £23,000, the software will run on an IBM 303X and replaces a manual system.

A writer's style is as personal as fingerprints

by Andrew Morton

DID Shakespeare or Bacon write Hamlet? Were the Casket letters written by Mary Queen of Scots? Did Paul write to the Ephesians?

To students of literature and of history these are three separate questions, but to a scientist they are three examples of a single problem for which a general solution is required, the problem of recognising a person from his written or spoken utterances.

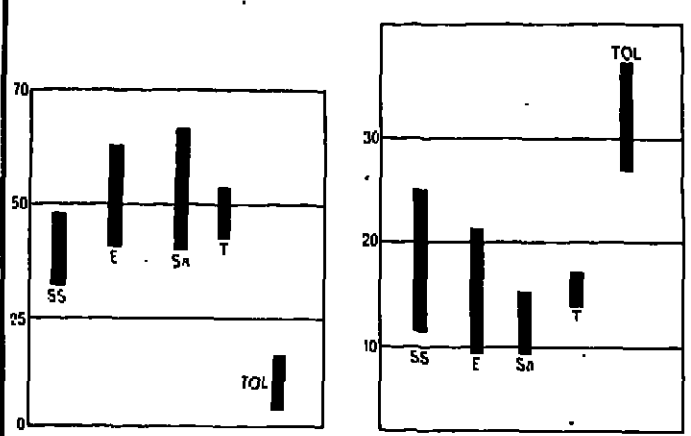
The descriptive science which enables this to be done is called stylometry.

As a recognition system stylometry shares the characteristics of all such systems and in its development it offers many parallels to the evolution of similar systems. The best known recognition system is that used by police forces for the identification of criminals.

As the 19th century progressed, cities, crime and police forces all grew larger. A pressing need arose for a system by which an officer could recognise a criminal from a description. The Paris police led in the creation of a filing system but as all the entries were made under names and the criminals used aliases no criminal had ever been recognised from a description. The descriptions were portraits *pariés*, the kind of thing which might be found in a letter, eg "the criminal is a young lady of slender build, well-dressed and well-spoken, of good manners and education."

For any serious use this kind of description is hopeless. There is too little information, it is in too few categories which are both ill-defined and variable and the information is subject to

Two Habits of Jane Austen compared with The Other Lady who finished Sanditon



SS is a sample from *Sense and Sensibility*, E one from *Emma*, Sa from *Sanditon* as written by Miss Austen. T a combined sample from the three; TOL is the work of *The Other Lady*.

natural and to deliberate alteration.

It was supposed that an advance was made when the same information was translated into figures, so that the suspect becomes a female, 62 inches tall, weight about 105 lbs, aged around 25 years and having long dark hair. This is a little better, but it is still not good enough to enable identity to be established with any precision.

The third stage arrives when someone asks the right question. If one asks to identify one person out of a few billion, using characteristics which are easy to

classify, to record and to compare, characteristics that can be altered or concealed only with great difficulty, what kind of information will tell you what you want to know?

The first successful system was that of Bertillon whose father was professor of anthropology in Paris. The son knew that a lot of information lay concealed in skeletons and so based his system on a few physical measurements, eg the circumference of the head, the distance from elbow to finger-tip.

He made the first identification by matching records. However, his system was not really practical, since it relied on precision measurements being made as a matter of routine by untutored clerks on unwilling subjects. It was overtaken by the development of finger printing, the first of a family of systems based upon biological regularities.

The introduction of all scientific recognition systems is resisted. It was pointed out that fingerprints are an affront to common sense, that from fingerprints no officer could recognise his own wife or children, and though it might seem to work, no advocate of the system could explain why it did work. It was more than 100 years after their introduction that the molecular biologists were to do that.

The first step towards a recognition system for literary studies is that of stylistic description. In many ways this is the most lively stage, for everyone can use his own criteria to support conclusions congenial to him.

But as they continue, stylistic studies reveal two fatal defects. The first is often expressed by the scholars themselves who will claim to be able to recognise any writer by his style but also be able to alter their own style that recognition is impossible. The other difficulty is the accumulation of catastrophic failures by which students of style are continually embarrassed.

A recent example was reported in the *Guardian*, the critics of both the *New Review* and the *Times Literary Supplement* had given opinions that an

imitation of Cleland was rather poor, failing to notice that included in it were passages, one of 300 words, lifted from Cleland.

The next step is to introduce some statistics into the stylistic description. This comes from an appreciation that a complete description of a writer will not only tell you which habits he has but how often he employs them. But as long as the figures only ornament a subjective opinion the result is no better than the purely qualitative description.

Stylometry begins when it is understood that the subject has three essential principles.

The first is that it is a science even if you are interested only in a single problem the method must be validated on a range of texts and writers before it can be applied to a particular case.

The second principle is that stylometry must be statistical. Writers do not repeat themselves, rather they resemble themselves. This means that while it would be nonsensical to say that ten pages of Dickens will have 50 occurrences of AND, it might make very good sense to say that ten pages of Dickens will contain, on the average, 50 occurrences. Habits vary around average levels and so comparisons must be made by statistics.

The third principle of stylometry is that as all writers in any language have so much in common — the language in which they write, the rules and conventions of its use, the social, cultural and historical background of their lives — the best discriminators are not the few idiosyncrasies which they might share with few other writers, but the different rates at which they use habits common to all writers.

This is clearly seen in the choice of words on which stylometry is based. As our choice of word is affected by subject matter, by mood, by recent experience, by a host of factors, it follows that the only safe foundation for stylometry is supplied by the words which we must use for any subject, in every mood and on all occasions. These are the words aptly called, by the Americans, the filler words, the frequent connectives which form the skeleton which supports the text.

Although the high rate of occurrence of these filler words is their most striking characteristic, it is not the most useful one, that distinction belonging to their frequency of occurrence in certain positions.

Position is relative, the sequence within sentences, 1st, 2nd, 3rd word and so on, can be measured; the occurrence of a word before or after another word, the mark word, can be recorded; or its occurrence in the intervals between successive occurrences of other words.

Different conventions are suited to different circumstances and the large number of possibly useful measurements, together with the necessity of examining these over a range of writers and texts mean that a computer is essential. In stylometric studies it is possible to apply a known result to a limited case by using hand



Public interest in computational linguistics was first aroused when it was shown that evidence for the authenticity of literary texts could be drawn from the study of an author's individual usage — stylometry. This is now finding a much wider range of applications, for instance in the legal field for the verification of wills, and of police statements.

Andrew Morton himself created a legal precedent in 1974 with his evidence that only seven of 11 police statements submitted in a case had been written by the defendant who was then acquitted.

Andrew Morton is carrying out literary research in the Department of Computer Science of the University of Edinburgh, using EMACS, the Edinburgh Multi-Access System. He is also a member of the Scottish Literary Detection, 11, 10, 50, published by Bower Publishing Co of Epping.

counts, but for anything more extensive the machine must be used.

It is not possible even to suggest the range of applications of stylometry. Elizabethan literature has a number of certain texts where the uncertainty derives from the lack of historical information; Victorian literature abounds with anonymous publications where the anonymity is a condition imposed by the publisher.

But when deliberate concealment is taken into account the applications range from police statements, wills and other legal documents to impositions made by mediocrity claiming not to represent but to be another person.

No one will claim that stylometry will answer all questions about the authorship and integrity of literary texts but it will solve a great number of current problems and allow attention to move to more important matters.

In a short general survey of this kind it is impossible to provide any detailed illustration, but two diagrams show typical applications. The first is an attempt to demonstrate the difference between Jane Austen and the Other Lady who completed, in 1802, the novel which had lain unfinished since Miss Austen's death. In literary terms the illustration is quite good, but the probability that 4,000 words of the Other Lady would be taken as Jane Austen is less than one in a thousand million.

The second illustration is of Shakespeare's disputed play *Henry VIII*. It has been argued that this is the result of a collaboration between Shakespeare and Fletcher. The case for Spelling in 1800 and has been tested by Thomas Morton. His conclusion is that the play is right in all but a few scenes.

Despite having to draw on its substantial financial reserves as a result of the current swing towards leasing by users of IBM computers and IBM compatible processors, Amdahl Corp still appears to have the most secure future of all the firms in the growing line-up of software compatible machine manufacturers.

Over the last two years Amdahl has been actively marketing its 470 series in Europe as well as in the US and has

achieved some impressive sales successes, notably with British Airways, the Italian government and several big motor manufacturers.

The company's position in Europe has been further consolidated with the establishment of an assembly plant in Ireland and an agreement with the French Thomson group under which Thomson will manufacture memories

for Amdahl machines built in Ireland (CW, May 3). Amdahl must also have been encouraged by the report published earlier this year by New York stockbrokers Paine Webber Mitchell Hutchins (CW, May 10), which predicted that it would have cornered 20% of the market for large scale mainframes by 1983.

KEITH JONES of Computer Weekly visited the world headquarters of

Amdahl Corp at Sunnyvale, California, a few weeks ago and talked to two of the company's top men. They were Bill O'Connell, senior vice president corporate marketing, the man in charge of the company's international sales operations, and Dr Andy Wang, director of LSI technology, whose responsibility is to maintain Amdahl's vital lead over IBM in the area of hardware performance.



O'CONNELL... "We have to get in earlier with customers in Europe."

Amdahl looks to a secure future

"WE were six months late moving into Europe. IBM had already announced the 3033, and a lot of potential customers for Amdahl machines had signed letters of intent for the IBM system."

This frank statement was made by Bill O'Connell in a discussion about Amdahl's European marketing strategy.

Despite this view, O'Connell is certainly not unhappy with Amdahl's performance in most parts of Europe, and he believes that the company is now taking off in West Germany, which has been the least successful major European market for Amdahl until now. The firm has, however, won two of its first European orders there — from the German space research organisation, DLR, and the Max Planck Institute in Munich.

O'Connell continued, "After we sold those two machines in West Germany at the end of 1978 there was a gap. The main reason was the toughness of

IBM in Germany. But we now have several commercial customers there, including Ford, Mercedes and savings banks in Munich and Nuremberg. By the end of the year we hope to have more machines installed in Germany than in the UK, even though Peter Williams, the managing director of Amdahl UK, has bet we won't.

"We got our salesforce organised quickest in the UK and Peter Williams is a great asset. We should have about 18 machines installed in the UK by the end of the year."

Orders announced so far by Amdahl in the UK include four machines from British Airways and one each from BOC Data-solve, Kays of Worcester, Chrysler, BL Cars, Ford, Rolls-Royce and Massey-Ferguson.

O'Connell explained, "We have been very successful in selling to manufacturing companies in Europe because they are used to buying from two vendors. But there is no doubt

that we have to get in earlier with customers in Europe than in the US, because they plan a long time ahead."

Asked about the competition from IBM continually faced by Amdahl, O'Connell commented, "We need to build up a solid customer base before the IBM H series arrives. One big problem for us is that IBM can forward announce prices. IBM can also make a lot of mistakes. We cannot afford to make one."

"Our biggest problem is finding the right people. Our growth as a company can only

match the growth in personnel and we need the best IBM people."

"We get most of our marketing and software personnel from IBM but on the engineering side we are now trying to bring in college graduates rather than taking engineers from IBM's big systems development centre at Poughkeepsie."

Highlighting one way in which Amdahl tries to make maximum use of its precious workforce, O'Connell explained, "Our systems engineers are also trained to handle hardware

maintenance in the field and they can take care of about 80% of the problems that arise."

Diagnostics are normally handled locally using an inbuilt 16-bit minicomputer which constantly monitors the performance of the Amdahl machine and which generates printout for the local maintenance staff. If they are unable to fix the fault rapidly they connect the mini online to an Amdahl Diagnostic Assistance Centre. Amdac, where expert engineers check the diagnostic information and phone instructions back to the

engineers at the remote installation.

Not surprisingly, Amdahl Corp is tight-lipped about precisely what form the forthcoming H series will take, although one hardware ingenuit looks like being the 3880 disc controller announced with the 4300 line earlier this year.

O'Connell revealed, "We have ordered a bunch of 3880s to see how they affect the channels on our machines and we are looking into factors like addressing 2nd bytes."

No dramatic change in technology

ACCORDING to Andy Wang, Amdahl Corp is currently working on integrated circuit technology for machines two generations in the future, but the company is not going to make any dramatic change in technology for some considerable time at least.

He explained, "Bipolar technology will be king here at Amdahl for a long time. The next two generations of machines will continue to employ emitter-



WANG... "Bipolar technology will be king here for a long time. Coupled logic, probably current mode logic."

Working closely with Amdahl on these future developments are two major collaborators — Motorola, and one of Amdahl's big minority shareholders, Fujitsu.

Asked how secure Amdahl's relationship was with these two organisations, Wang commented, "We have an iron-clad agreement with both them and Fujitsu to stop them selling the devices we jointly develop with them to other computer manufacturers. We deal separately with

Fujitsu and Motorola, and we have to be discreet to each of them about what the other is doing, but both of them trust us."

"With Fujitsu we have a joint effort in new semiconductor technology, which is a continuation of an agreement first signed in 1972."

Amdahl's relationship with Motorola is that of customer and supplier. Motorola's plant at Phoenix, Arizona, now being the principal source of Amdahl's ECL logic chips. Motorola used to second-source parts made for Amdahl by Advanced Micro Systems before AMS left the bipolar business in the mid-1970s.

Amdahl has agreed with Fujitsu to use the Japanese firm as its principal source of custom LSI components for the next generation of Amdahl computers.

Asked whether Amdahl was taking Josephson junction technology seriously, in view of IBM's much publicised work in the cryogenic superconductor area, Andy Wang commented, "We are not working on Josephson technology, because its practical application is too far ahead in the future. Moreover, there are bound to be serious maintenance problems with Josephson-based machines, and I think they will only be used for special systems."

In the much more prosaic present day area of MOS memory technology, Amdahl adopts a conservative approach. The main stores of its 470 machines are still built from 4K-bit chips and the company will only start using 16K parts when they become cheaper to use than 4K. About 70% of Amdahl's 4K chips come from Mostek and the rest from Texas Instruments and Fujitsu.

Build a better understanding with the users of microelectronics

MICROSYSTEMS'80

Wembley Conference Centre, January 30 to February 1, 1980

Microsystems is a conference and exhibition which alerts industrialists and businessmen to the nature of this Second Industrial Revolution, and bridges the gap between the microelectronics expert and the engineers, scientists, systems designers, educationalists and others who use his skill and products. It is an open door to better business for suppliers of both hardware and software — microprocessors, memories, interfaces, peripherals.

In its third year, it moves from a hotel show to the more spacious Wembley Conference Centre, with some 1,400m² of exhibition space.

TO TAKE PART IN MICROSYSTEMS '80, CONTACT LLOYD COLLINS OF "COMPUTER WEEKLY" ON 01-261 8743 OR 8022 OR WRITE TO HIM AT ROOM 13, DORSET HOUSE, STAMFORD STREET, LONDON, SE1 9LU.

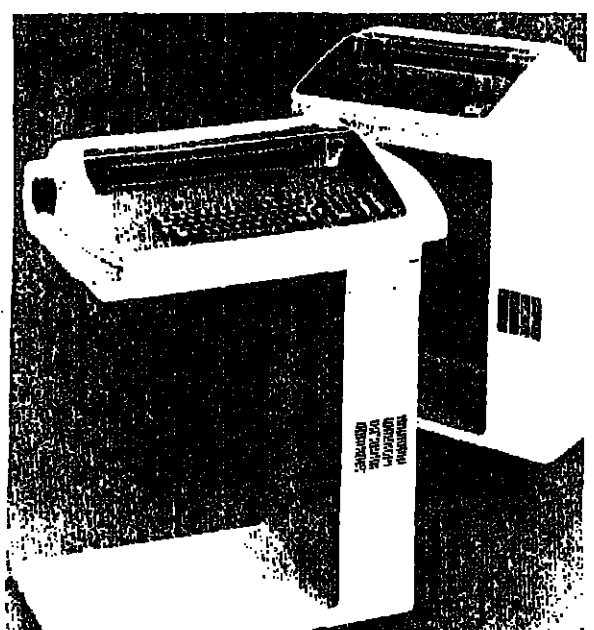
is sponsored by Britain's most influential range of electronic and computer journals, including "Computer Weekly", "Systems International", "Data Processing", "Electron", "Microprocessors", "Wireless World", "Electrical Times", and "Electrical Review". Organisers on their behalf: IIPC Promotions Ltd. All are members of IIPC Business Press Ltd.

PRODUCT NOTES

New range of printers from Data General

A RANGE of terminal printers has been announced by Data General. They print at 180 characters per second, are logic

seeking and bidirectional printers. They are available in receive only and keyboard send/receive configurations.



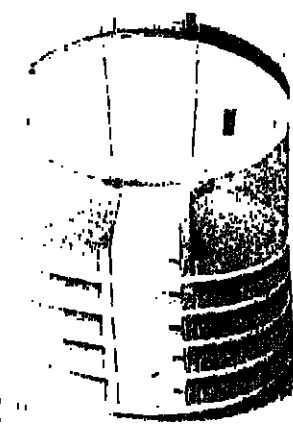
TP2 printers

Cartridge cover

SIDE and front loading cartridges can now be protected when off the drive by a security cartridge cover from Wespac. It fits over the base of front and side loading cartridges, providing a seal to keep out dust and pollution.

Storage and stacking problems are solved by the Wespac cover's positive locking, which enables cartridges to be housed safely in vertical racks or stacked horizontally. It is made from lightweight low density polythene.

The cartridge cover costs £4.90 and quantity discounts are available. Wespac (CW), 154-158 Shorelitch High Street, London, E1. Tel: 01-729 1170.



Wespac cartridge cover

Miniature printer

A MINITURE printer, which can be programmed to produce pictures, diagrams and text of any kind, has been developed by English Numbering Machines. It is the FSP40 and occupies 400 square cm of desk space.

Unaffected by vibration, the FSP40 can operate in any position, even upside down. It prints on electro-sensitive paper at rates of up to 280 characters per second. The print-out is clear and is not affected by water, temperature or infra red and ultra violet light.

A built-in microprocessor enables printing of upper and lower case characters in various styles and widths. Buffer output is applied directly

to the pinhead for plotting diagrams, so the unit can plot curves and circles and produce accurate maps, drawings and copies of photographs.

The FSP40 measures 205 x 210 x 105 mm, and weighs 3.8kg. It operates from a 12 volts dc supply and consumes 24 watts when printing.

English Numbering Machines (CN), Printer Division, Queensway, Enfield, Middlesex. Tel: 01-804 8121.

Miniterms

THE Miniterms 1204 and 1205 portable terminals are available with removable storage media. Both microprocessor based models are alike, except that the 1205 has the addition of the built-in acoustic coupler. They both feature a built-in mini-cassette tape unit with 85,000 characters and integral 8K random access memory expandable to 32K.

Teleprinter Equipment (CW), 70-82 Akeman Street, Tring, Herts. HP23 6AJ. Tel: 0442 82 4011.

Floppy tray

FLOPPY discs can now be stored easily and inexpensively with the desk top tray introduced by Templestock. The tray can hold between 60 and 80 floppy discs without risk of damage. If required the trays can be placed in trolleys or hanging frames in cabinets. Also lockable lids can be supplied by Templestock.

Templestock (CW), 1 Ravenscourt Park, London W10 7TZ. Tel: 01-629 8555.

Xerox 9400

RANK Xerox has introduced duplicators that incorporate microprocessors. The Xerox 9400, 9401 and 9402 gives automatic double-sided copying at a rate of 7,200 copies per hour, features a fully automatic document handler and three fixed reduction ratios and a variable zoom reduction.

The Xerox 9400 copies at a rate of 45 per minute, with a

The terminal printers use Data General's 16-bit MicroNova microprocessor to control the various printer functions such as tabbing features and variable character formats. Dasher TP2 printers are available in four models: RO model 9075 and KSR model 9077 print in normal and elongated character widths. RO model 9078 and KSR model 9078 also print condensed characters at 18.5 to the inch.

Data General (CW), Hounslow House, 724-734 London Road, Hounslow, Middlesex. Tel: 01-572 7455.

Data logger

THE Model 2200B data logger from Fluke has the ability to handle RTD inputs as well as standard thermocouple, voltage and current transmitter sources. Other features include enhanced alarm and trip facilities and a built-in 24 hour time of day clock.

Fluke International (CW), Colonial Way, Watford, Herts. Tel: Watford 40511.

Extel 951

THE Extel 951 microdisc is a minidisc recorder featuring extensive search and editing facilities. It will provide a storage capacity of over 200,000 characters on a miniature flexible disc, and offers full add, delete and replace editing on file contents and high speed searching for chosen strings of up to 15 characters. The Extel 951 is an RS 232C compatible device.

The Exchange Telegraph Company (CW), 72/76 Scrutton Street, London, EC2. Tel: 01-739 2041.

Intel kit

INTEL has announced the 8088, its 16-bit microprocessor, and at the same time the 8088-85, which is a complete MCS-86 microcomputer system on a single board in kit form, and is designed to enable engineers to gain experience of the hardware, architecture and machine code of the 8088. It contains all the necessary components to build a system in a few hours.

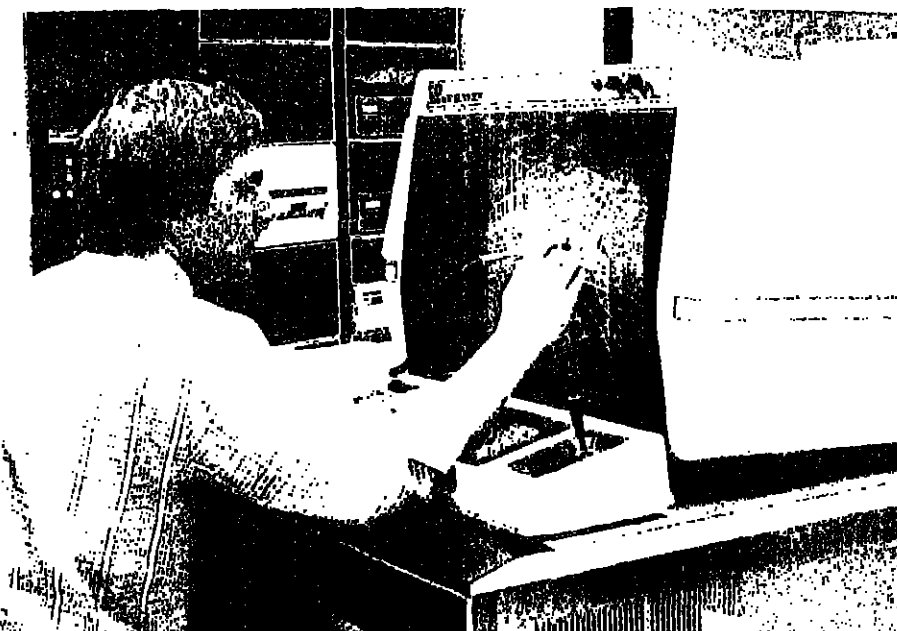
Intel Corp (UK) Ltd (CW), 4 Botolph Claydon Road, Botolph Claydon, Norfolk. Tel: 01-804 8121.



Xerox 9400

bi-directional sorter, while the 9401 is designed for the low to medium copy volume user, making between 5,000 and 25,000 copies per month. All three machines have a diagnostic code system which tells the operator the reason for malfunction.

Rank Xerox (UK) (CW), Bridge House, Oxford Road, Oxford, Oxfordshire. Tel: 01-275 4000.



The Whizzard 7000

The Whizzard family

MEGATEK Corp has announced a new line of vector refresh graphic systems known as the "Whizzard", which comprises graphic peripherals, graphic terminals and stand-alone graphic processing systems.

The Whizzard 7000 series features a new improved vector generator, and another feature is the three dimensional rotation and an optional colour monitor. Four colours are standard, with an optional fifth colour available. The Whizzard 7000 incorporates all the standard features offered by the older Megatek 7000 system.

For Nova or Eclipse owners, the Whizzard 5000 family offers refresh graphics with selective erase, translation, rotation, scaling

and zoom. The Whizzard 5000 is available as a stand-alone processor, RS 232C communicating terminal or dual board MG552 processor for installing within a customer's Nova or Eclipse computer.

The Whizzard 5014 systems are designed easily to replace, and be upward compatible with, the Tektronix 4014 TM series of storage tube terminals.

Megatek Graphic software is a Fortran package which is designed to make the Whizzard a user oriented system.

Megatek (CW), 3931 Sorrento Valley Boulevard, San Diego, California, 92121, USA. Tel: (0101-714) 455 5590.

Twinlock storage

TWINLOCK UK has introduced a varied range of products for storing computer printouts. The range includes storage binders, filing storage units and storage trolleys.

Twinlock DP filing offers a choice of lateral or vertical suspension systems, and the Multi-Stor lateral filing cabinet allows a large filing capacity with the added benefit of security. The lockable quarter width doors protect the binders and save access space.

The cupboard is 75 inches tall and will hold five tiers of standard depth binders. Also available is the side issue cabinet, with a lockable roller shutter door, and the universal trolley, suitable for conventional suspension files.

Twinlock (UK) (CW), 38 Croydon Road, Beckenham, Kent. Tel: 01-850 4818.



Multi-stor filing cabinet

HP plotter

THE latest plotter from Hewlett-Packard, the HP 7225A, is able to provide hard copy graphics from microprocessor based systems. It can provide publication quality plots by drawing clean continuous lines. The HP 7225A plots at 250 mm/s between points and will generate three characters per second for quick annotation.

Hewlett-Packard (CW), King Street Lane, Winnersh, Wokingham RG11 5AR. Tel: Wokingham 784774.

Sockets

COMPUTER terminal sockets are now available from Daceward. The TS1K series are standard wall mounting outlets for RS 232C type terminals. They comprise white rectangular plates compatible in style and fitting with MK's range of electrical outlets and boxes. One, two or four sockets are available on each plate.

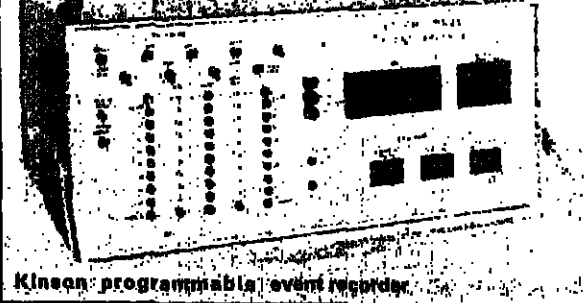
Daceward (CW), The Computer Centre, Bugbrooke Road, Gayton, Hants. Tel: Billsworth 85888.

Kinson recorder

AN advanced programmable event recorder, developed by Kinson Electronics, is designed to capture event data in medical and industrial applications. It is known as the Model 4001 and contains an internal microcom-

puter. It provides a printed record of external events occurring over a period of time.

Kinson Electronics (CW), 17 Wellington House, Eton Road, London, NW3. Tel: 01-586 0325.



Kinson programmable event recorder

TV camera systems

GRAPHIC Display Systems of Cambridge has introduced two models, the GDS-2000A and GDS-2000H, as additions to its GDS-2000 range of TV camera systems.

The basic GDS-2000 comes as a TV camera mounted on a head, pivot-hinged to the display. The GDS-2000A has more sophisticated mount giving multi-lens, variable image magnification feature with the optional use of a 200x lens.

The GDS-2000H, using a broadcast quality camera, has the same mounting arrangement and a high resolution and prices are from £100. Graphic Display Systems, 1 Hemingford Road, Cambridge. Tel: 0223-51643.

Rastoriser

MEGATEK's Rastoriser is a vector-to-raster converter and electrostatic printer interface that produces hard copy for the Megatek 7000 refresh terminal in 10-15 seconds. The Megatek 7000 graphics system features refresh memory, 12 bit resolution and a 32 bit micro-processor. Optionally available are select erase hardware translation, blinking and dashed line with hardware rotate, scale, clip and zoom options.

Megatek (CW), 3661 Sorrento Valley Blvd, San Diego, California, 92111, USA. Tel: (0101-714) 455 5590.

Keyboard

A MICROPROCESSOR controlled data processing keyboard for numerical control work has been announced by Control Tape Services.

The keyboard is designed and specified by an operator engineer for NC tape production and editing. Features include 45 chips printer, search facility for feeds, speed and rotation commands. There is a range of options for specifying individual requirements including data transmission facilities, and program output.

Control Tape Services (CN), Glaziers Lane, Normandy, Surrey. Tel: Normandy 2432.

Decwriter IV from Rair

AN addition to the Rair range of Digital Equipment terminals is the Decwriter IV, a 300 baud desk top terminal, which prints at speeds of up to 45 cps. Small and lightweight, it is designed for operator convenience, and one of its main features is its ability to act as firmware from the keyboard or the host computer.

The Decwriter IV costs under £900, or can be rented from around £51 per month.

Rair (CW), 30-32 Neal Street, London, WC2. Tel: 01-836 1463.



The HP 3076A

FOR use in manufacturing companies, on the factory floor and in offices, Hewlett-Packard has introduced a range of three data terminals. The HP 3076A is a desktop terminal for applications such as finance, stock control and purchasing.

A wall mounted version, the HP 3076A, may be fitted with a multifunction reader and printer so that it can be used to record work in progress in a machine shop. The HP 3077A, also a wall mounted unit, may be used for employee time reporting or to control access to restricted areas.

Options include a choice of numeric or alphanumeric keyboards and displays, and a wide

choice of data communication interfaces. Prices are from £1,100. Hewlett-Packard (CW), 17 Wellington House, Eton Road, Wokingham RG11 5AR. Tel: Wokingham 784774.

Brochure

SYSTEMS Production brochure is now available. It describes the company's range of products, including its playing systems, software, security and software.

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Contact: Margaret Stevens

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Contact: Mike Creamer

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Napier College of Commerce and Technology
Colinton Road, Edinburgh, EH10 5DT

**To a Programmer
with potential...**
...we can offer the opportunity to play a significant part in a company within one of the world's largest organisations.

Our Head Office location on the South Coast employs 160 people and someone with one or two years programming experience can soon play a key role in the system's development within the company. We are looking for a young graduate, preferably with COBOL experience, to work initially on a real time data base system on Data General C330 and M600 computers. The company is about to extend the use of on-line methods into other aspects of its commercial systems, which currently operate by RJE to a major IBM computer centre in London. Future development plans include a substantial data base system for our manufacturing plant on IBM equipment and future career progression could be in this direction.

If you have the potential and the ambition necessary to join this project, we will offer a highly competitive salary and benefits package which will, of course, include relocation to the South Coast.

Please write with full personal and career details to: Mike King, Employee Relations Department, Esso Chemical Limited, Arundel Towers, Portland Terrace, Southampton, SO9 2GW

PROGRAMMERS
ARE YOU HUNGRY?

- * Earn up to £7,000 in the food industry!
- * A new IBM 4300 has been ordered for you!
- * New on-line systems to get your teeth into!

Based in Hertfordshire, our client is a leading international company in the food manufacturing industry.

Right now they need programmers with at least 12 months' experience in COBOL to develop a range of new on-line systems which will serve the company into the 1980s.

They also need experienced COBOL programmers with a good knowledge of one of the following — CICS/VS/VSAM/BAL to work closely with Systems Analysts on new applications.

You can start on an IBM 370 under DOS/VS and get full training on IBM 4300 which is due later this year.

The tremendous variety of existing applications and those planned for development will fully satisfy your hunger. There are excellent career prospects with the department and you will add considerably to your present skills and get a high level of job satisfaction.

There is a lively sports and social club and, in case you are still hungry — a subsidised restaurant. The company will also help with relocation costs where appropriate.

For more information please call Barry Holden or write to him at

Castle Computer Services Limited
Recruitment Consultants
271 High Street, Berkhamsted, Herts, HP4 1BW. Phone: (04427) 73151.

NEWCASTLE UPON TYNE POLYTECHNIC
Computer Unit

The Computer Unit provides a computing service for the teaching, research and administrative work in the Polytechnic. The Unit is linked to an IBM 370/168 at NUMAC and operates its own multi access computers. A new 24 terminal system is currently being installed.

Applications are invited for the following new posts in the Programming and Advisory Services division:

PROGRAMMING ADVISER

Burnham Lecturer II

To develop and promote the application of computers in the curriculum. Work will include liaison with lecturing staff. Candidates should have experience of programming and teaching in one of the following fields: Science and Technology, Business and Management.

A degree or equivalent qualification is required.

PROGRAMMER/ANALYST

(2 POSTS: 1 FULL TIME, 1 PART-TIME) AP4/5

To design, specify and implement computer programmes and packages across a wide range of subjects. Knowledge and experience of two major computer languages and one year's experience is required.

A degree or equivalent professional qualification is required.

Burnham F.E.: £11, £4470-£7149 plus £72 salary supplement p.a. N.J.C. Salary and Conditions: AP4/5; £4248-£6073 (Inclusive, under review).

For further particulars and application form please send a stamped addressed envelope to the Personnel Officer, Newcastle upon Tyne Polytechnic, Ellison Building, Ellison Place, Newcastle upon Tyne NE1 5BT.

Closing date for applications: 23rd August 1979.

A CHALLENGE!!

An American oil company is urgently seeking a COBOL programmer with all-round ability to work in a small development team. This could involve assignments abroad for up to 3 months (with your immediate family if desired) but is based in South Middlesex.

Education: 'A' levels — degree preferred

Experience: 2-5 years' programming

Applications: Accounting, Warehousing, Stock Control

For an outstanding applicant the company is able to provide a very rewarding career with better-than-average benefits.

Apply in the first instance to R. S. Harborne, 01-838 8319.

**Harborne
Appointments**

Systems Analyst/
Programmers

£4,500-£5,750 Edinburgh

The Institute of Occupational Medicine is the coal industry's research centre for medical and allied problems. We seek experienced analyst/programmers for the development of research-related computer projects. Languages used are Cobol, Fortran and Assembler. Access to an IBM 370/158/3033 system is via a multi-function terminal system with interactive and batch facilities.

Salary, dependent on experience and ability, will be in the range £4,500 — £5,750 and is supported by excellent conditions of employment.

The appointment is for a period of three years.

Please apply, in writing, to

NCB

The Area Staff Manager/Secretary,
National Coal Board, Green Park,
Greenland, Edinburgh EH17 7PZ.



The chance of a lifetime AND an exciting career

Our Client is a progressive, International, American Company, established in 1967. They have grown to be one of the leading and most successful Management Information companies in the world — and provide a unique interactive data processing service to the 12,000 Businessmen that use it daily.

Their commitment to the future is substantiated by the vast sums being spent on new and exciting developments that will further consolidate their leadership in this and other buoyant sectors.

PLUS WIN YOUR WAY TO SUNSOAKED ISLANDS

After intensive sales and product training which will include trips to the East Coast you will gradually be involved in selling their comprehensive range of Management Information tools that carry a high reputation in this exhilarating market.

With the emphasis on training, career and personal development you will have every opportunity to reap the high rewards from the effort invested with all the back-up and help you will ever need there is nothing to stop you from joining the growing number of SALES EXECUTIVES that enjoy trips to exotic places in the sun as well as earnings that are above average.

STILL INTERESTED? ANSWER SOME QUESTIONS THEN!

- 1) Is your present situation suffocating you?
- 2) If you are not in a selling role would you like to be?
- 3) Would you like the best sales and product training in the industry?
- 4) Do you wish to advance and be recognised?
- 5) Do high rewards for your efforts interest you?
- 6) Would you like to visit America a few times for training?
- 7) The last trip was to Hawaii, would a similar venue interest you?

If you answered YES to all the questions and you live in London or the Home Counties and wish to enjoy working for a top rate American Company as a name, not a number — take your first step to the States.

FOR AN IMMEDIATE AND CONFIDENTIAL INTERVIEW RING: SIMON LEVER, ADVISING CONSULTANT ON: 01-935 0671 (24 hour answering service) reversing the charges if necessary or write giving brief details.

London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

Specialist Computer Recruitment Ltd

SYSTEMS ANALYSTS
PL1 PROGRAMMERSBristol
£5,000-£7,000++

Our clients, Phoenix Assurance Co. Ltd, are an extremely successful organisation with an ever-growing commitment to data processing. Their mainframe is a 4mb IBM 3032 under MVS; software includes Task/Master as TP monitor, ADABAS DBMS and ROSCOE for on-line program development.

Additional staff are required now for a variety of applications. If you have two years or more of worthwhile experience then consider these benefits:

- Progressive salaries with regular reviews
- Modern office conditions with flextime and paid overtime
- Subsidised mortgage facility
- Subsidised Staff Restaurant
- First class pension scheme
- Assistance with removal expenses
- etc etc

Knowledge of on-line systems, database techniques or insurance is not essential as full and regular training is given where needed.

Interested in living and working in this lovely part of the West Country?

Then apply in the first instance to: Keith Dawe, Sanderson Executive Recruitment, 68 Queens Road, Clifton, Bristol 8.

Should you want additional information before submitting a formal application to Sanderson Executive Recruitment, please contact Chris Frew, Assistant DPM, Phoenix Assurance, Tel: Bristol 294041

Sanderson
EXECUTIVE RECRUITMENT
TELEPHONE 0272 211741/5

01-935 0671

Our Clients are a fast-growing British Company based in Surrey and marketing a full range of services and in-house mini computer systems to the commercial sector.

Their in-house Business System can be used exclusively for Data or Word Processing, or for a unique combination of both. In order to continue their planned and secured expansion in this particular area, they are looking for accounts or commercially orientated people to join their select sales team.

MORE THAN JUST ANOTHER SYSTEM

You will be selling a total service package that is backed up by pre-implementation consultation, installation and training, implementation, support, hardware and software maintenance plus ongoing customer care.

That is what first time users want, and consequently a Company able to supply their total information requirements is in a fortunate position, as is their Sales team.

THE CANDIDATES

Applicants should have a successful computer sales, accounts, or systems background. A desire to advance to higher positions within the Company is a necessity as is the ability to get on in a close environment where people matter. Full sales and product training will be given to enhance your already well-developed talents.

THE REWARDS

You will receive a basic salary of around £7,500 and a bonus structure that will put you in the £15,000 bracket. A guarantee can be negotiated to protect your earnings. As well as a Company car, you will receive benefits that are normally associated with the multi-Nationals.

So if you are fed up with being just another number, take an important step to being recognised by name.

FOR AN IMMEDIATE & CONFIDENTIAL INTERVIEW: Ring SIMON LEVER, Senior Consultant on 01-935 0671 (24 hour answering service) OR WRITE giving brief details.

London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

Specialist Computer Recruitment Ltd

Design Quality Engineer

Computer Peripherals

North Midlands Circa. £9,000

This senior position provides a first class opportunity to the experienced engineer who wishes to broaden his sphere of operations without limiting the opportunity for personal innovation.

The successful candidate will be responsible for ensuring a quality approach to be adopted at the design inception stage within a rapidly expanding development group. Confirmation that the required quality has been realised prior to field use of the equipment will be a principal activity.

Applicants aged 27 or over should have a design background in electronics, ideally on controllers and interfaces, along with a working knowledge of software systems. This experience will be accompanied by a firm understanding and, preferably, experience of quality assurance methods.

Male and female candidates should apply for confidential form quoting Ref: 274/CW.

Management & Executive
Recruitment/Selection

**Wickland
Westcott**

Green Lane, Wilmslow, Cheshire,
SK9 1LJ. Tel: (0625) 532446. (24 Hours)

Bangkok, Thailand £15,000+

Senior Software Support Engineers with sound knowledge of the following IBM operating software: DOS/VS DL1 VM/CMS. Banking systems or aviation experience advantageous.

Initial 12-month tour, with possibility of extension.

Write or telephone

Magnuson
Air Transport Computers Limited
Cedar Court, 11 Fairmile,
Henley-on-Thames, Oxfordshire,
Great Britain.
Telephone (04912) 78159
Telex 847298

THE ST. HELEN'S COLLEGE OF TECHNOLOGY SCHOOL OF MANAGEMENT STUDIES LECTURER II/SENIOR LECTURER IN SYSTEMS ANALYSIS AND COMPUTER STUDIES

The School of Management Studies (part of the North West Regional Management Centre) has a well-established reputation both regionally and nationally in the fields of post-graduate and post-experience management education.

The person appointed will work with a group of staff from several quantitative disciplines teaching on a range of specialist short courses, in particular the N.C.C. Basic Systems Analysis Course. He/she will also contribute to all appropriate management studies courses within the School.

Candidates, who will be graduates, must have up-to-date knowledge of computer based information systems and hold or have recently held a position in Systems Analysis. Teaching experience would be an advantage.

SALARY: £4470-£8263 (Starting point dependent on age and experience).

Application forms and further particulars are available from the Principal's Office, The St. Helen's College of Technology, Water Street, ST. HELEN'S, Merseyside WA10 1PZ, and should be completed and returned within twenty-one days of the appearance of this advertisement. Please quote Ref: No. 1/CW.

MYRIAD

SQUARE ONE FOR FIRST-CLASS COMPUTER CONSULTANCY OPPORTUNITIES

LONDON AND HOME COUNTIES (+ Profit Share) c£6000-c£8000

We have been retained to recruit PROGRAMMERS & ANALYST PROGRAMMERS for our client SQUARE ONE COMPUTER SERVICES — based in BUCKS.

Can you offer 3-4 years in your chosen data processing career area?

Then experience the opportunity to:
★ Develop your career in a professional systems and programming consultancy.

★ Extend your hardware and business experience.

★ Receive a sound training in consultancy.

★ Benefit from a very competitive salary with a challenging career prospect.

Ref. NW1/0909

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 (24 HOURS)

Major opportunities in NORTH EAST ENGLAND

As a guide the broad salary bands are

Systems Analysts

£15,000 - £17,000

Programmers

£14,500 - £16,500

MOST IMPORTANT Specific salary packages and job involvement details will be tailored to suit the experience and ability of successful candidates. With this organisation there are no barriers to recruiting the best people! We would like to talk to DP people with from 1 years programming experience upwards and we will meet you in the North East, Midlands or London depending on your choice. Contact Ivor Norton quoting reference CW/79041 for systems analysts and CW/79042 for programmers.

Are you a really ambitious systems analyst or programmer?
Would you like to work on the development of major systems throughout a large organisation?
We are advising this client on the recruitment of development staff and there are a number of vacancies at various levels of experience, and
★ Salaries offered will be difficult to beat in the area IF you have the talent and experience.
★ Your promotion prospects will be difficult to beat IF you have the right ability.
★ The experience you will gain would be difficult to beat IF you join the organisation now.

This advertisement must appeal to systems analysts and programmers.

★ Working/living in the North East.

★ Who would like to work in the North East.

★ Who are prepared to consider moving to the North East.

★ Or maybe you just want to return home.

For those of you who do not know the area very well there are excellent amenities including sports and recreational facilities, large areas of scenic beauty - Northumbria - together with a long and attractive coast all within easy reach of our client's location. Additionally cost of living and house prices are reasonable and we have a client who will assist generously with relocation costs where appropriate.

Ivor Norton Management Services Ltd

RECRUITMENT CONSULTING DIVISION
52 Shaftesbury Avenue, London W1V 7DE. 01 734 8862 (24 hour answering service) P.O. Box 63 Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628

Programmers Walk into an extra £1½K

Look at these outstanding opportunities for Programming Staff! Our D.P. Operation is based on a large ICL mainframe, involves a large number of mini-computers, and includes a communications network.

SENIOR PROGRAMMERS

Work entails participation in system design, program specification writing, quality control, and the supervision and scheduling of teams of programmers. Applicants should have around 5 years' meaningful experience using COBOL.

PROGRAMMERS

Must be capable of producing correct programs within an agreed timescale. COBOL experience is essential. Some of the programming work involves mini-computers; training will be provided.

Location

Feltham, Middlesex. Ideally situated between the M3 and the M4, and close to Feltham Railway Station.

Salary

Candidates with the correct qualifications could expect to significantly improve their current salary. We would not be surprised if this amounted to an extra £1½K.

Other Benefits

Free 3-Course Lunch, Subsidised BUPA, Pension Scheme, Free Life Insurance, Free Christmas Turkey, Sports and Social Activities, Relocation Expenses where appropriate.

Please telephone Angeline George for an appointment on 01-890 1313.

THE **RMC** GROUP

We're into much more than you think.

01-890 1313

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JBA**GERMANY**
COBOL Programmers (Univac)

DM 50,000
Lovely opportunity for COBOL experienced programmers, must be Univac 1100 or 494 series, to join a building society on permanent staff. No knowledge of German is necessary (but would be bonus) and superb benefits are offered, e.g. cheap mortgage, etc. Location is Hanover.

FORTRAN Programmers (Univac)

DM 60,000
We are seeking a number of programmers experienced in ASCII FORTRAN, preferably with good knowledge of Univac 1100 series under Exec.3. Work is applications systems connected with a large air freight handling system. Project duration from 12 to 18 months, location Frankfurt and Stuttgart.

INTEL 8080 Engineers DM 60,000
Opportunity for software design engineers to work on very advanced word processing systems in Munich for at least 1 year. Knowledge and experience of ASSEMBLER or PLM is required. We also have requirements for micro processor engineers elsewhere in Europe, so please call us for more information.

Contact: Mike Creamer or Andy Wright

PLEASE NOTE

JBA have moved to new premises
and our address is now:
32 SAVILE ROW
LONDON W.1.
Tel: 01-439 9311

For further information on any of the above vacancies, please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants,
32 Savile Row, London W.1. Tel: 01-439 9311.

Senior Systems Analysts

Middlesex Up to £9,000

Our client is a leading international company in the design and development of engineering products for a wide range of industries. The company has several manufacturing plants throughout the UK but all data processing is centred in Middlesex.

They have an IBM 370/138 running under DOS/VS with CICS on line enquiry and up date applications running. Recently a feasibility study has been completed for a complex on-line order processing system using DI/1 and two senior system analysts are now required to join the development team. It is estimated that implementation of this system, part of a major e.d.p. development plan, will take two years.

Candidates should ideally have an industrial background and have designed and implemented at least one major system. More importantly, the positions will demand a high degree of business sense and ability to maximise the efficiency and ultimate flexibility of the system. The company have a sound reputation for good training and employ modern techniques, including audio/visual aids, for this purpose.

This represents a wonderful opportunity to apply creative ability in an interesting design project which will be a valuable career contribution.

Contact: Mike Creamer

Systems Analyst/Programmer

Are you interested in System 38?

If you are, we may well have the right career opportunity for you. We are Bristol-Myers Company Limited, a major international Organisation in the Toiletries, Hair Care and Pharmaceutical Industry, with products such as Mium and Fresh & Dry deodorants, Angiers Junior Aspirin and Nice 'N Easy hair colourants.

Currently we operate IBM system 3, model 150 but we shall be upgrading this to a system 38 in 1980. We are looking for a mature, self-motivated man or woman, who would revel in the challenges of such a change. He/she must also be able to communicate effectively with 'user' management and have a good general commercial systems background. Experience of RPG2 is essential and if you have a knowledge of IBM systems 3 and/or CCP, so much the better.

For the right person, salary will not be an obstacle, and the opportunities for career development are excellent. The Company benefits include a generous annual bonus, free life assurance and assistance in relocation.

If you want to know more please telephone Sue King, Personnel Manager, Bristol-Myers Co. Ltd., Station Road, Langley, Slough, Berks. Tel. Slough 44286, ext. 240 or Slough 49812. Alternatively, send her details of your career to date so we can assess your suitability for this position.

Bristol-Myers**NATURAL ENVIRONMENT RESEARCH COUNCIL**
NERC CENTRAL COMPUTING GROUP
ASSISTANT SCIENTIFIC OFFICER

The NERC Central Computing Group has a vacancy for an Assistant Scientific Officer to work at the Bedford Laboratory, Chilton near Didcot, Oxon. The post will involve providing general user support for the Univac computer. Specific responsibilities include support of existing major software systems, fault finding and job tracing when problems arise.

Minimum educational qualifications for appointment are: 3 GCE O level passes including English Language and a Scientific/Mathematical subject. Candidates should normally be under 20 years of age on 1st Dec. 1979. Salaries 12 070 p.a. (age 18-21) to 13 080 p.a. (age 21-23) to 14 115 p.a. (23-25) at 1 August 1979. These scales will be revised in January 1980.

Daily travel facilities are available from the Bedford Laboratory to most of the neighbouring towns and villages. Flexi-bus and recreational facilities are provided.

Staff of the Council are not Civil Servants but enjoy pay and conditions of service comparable to Civil Servants.

Application forms may be obtained from Ken Young at NERC, Polaris House, North Star Avenue, Swindon (Tel. 0793-40101). Completed application forms should be returned by 10th August, 1979.

MYRIAD**DATABASE DEVELOPMENT**

FOR IBM 4300
SENIOR ANALYST
MIDDX (HAYES) £7500

This is an excellent opportunity for a systems analyst who wishes to progress to a project leading role in an on-line DL/1 database environment using the latest IBM hardware.

The person appointed will be trained in DL/1 applications development where necessary and will then become responsible for building and leading a team developing a system to handle all aspects of manufacturing, production control, stock control and order processing. He/she will be able to offer a sound analysis background, preferably incorporating experience of manufacturing applications, and experience of an IBM database management system will be advantageous.

At present the company operates an IBM 370 mainframe running under DOS/VS, POWER and CICS. However, a 4331 and a 4341, with DOS/VSE software, are on order and are due for installation in the near future.

This is an ideal opportunity for a person seeking career advancement in a dynamic installation, and the successful candidate may expect to progress to Project Manager status in the near future. As one would expect of a major international organisation relocation expenses will be offered where appropriate.

Ref: SW1/0908

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 (24 HOURS)

MYRIAD**INTERNATIONAL ENERGY ENGINEERING PROGRAMMERS/SENIOR PROGRAMMERS****NEAR LONDON BRIDGE****£6000-£7500**

Our client is an independent organisation with a worldwide operation controlled from the United Kingdom. For the last century they have been innovators in their field supplying plant to the power and process industries throughout the world. Even in the weak business climate of recent years the group has managed to substantially increase turnover and profitability with its careful investment policy. In line with this expansion the company has recently upgraded to an IBM 370/158-3. Accordingly to cope with their active development programme they are seeking the following professional staff.

PROGRAMMERS**£6000**

Applicants should have a minimum of two years' strong COBOL programming experience and whilst knowledge of IBM equipment is preferable the company runs a comprehensive training scheme for those with other machine background. Initially much of the work will involve redevelopment of financial systems and a knowledge in this area would therefore be a distinct advantage.

SENIOR PROGRAMMERS**£7500**

This is a senior position responsible for a staff of up to eight people. The successful candidate will have at least five years' IBM OS COBOL and preferably be conversant with Assembler. Since a degree of new development will be on-line, a knowledge of CICS in a financial environment will obviously be advantageous.

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Department of Computer Science
SRC RESEARCH STUDENTSHIP

Applications are invited for an SRC Research Studentship to investigate Braille translation. This project, in collaboration with the Royal National Institute for the Blind, aims to produce a low-cost office machine capable of accepting typewriter input, and forming Braille on a refreshable Braille display.

Candidates would normally be required to have a good Honours Degree in computer science or electronics.

Applications, together with the names of two referees, should be submitted as soon as possible to Dr. G. R. Dowling, Department of Computer Science, The City University, Northampton Square, London, EC1V 0HB, from whom further particulars may be obtained.

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APPOINTMENTS IN IRELAND

Wanted—400 more programmers a year

TWELVE months ago in Computer Weekly, in an article entitled 'Ireland Needs to Attract its Ex-patriates', I highlighted the increasing shortage of skilled computer personnel and suggested that one way to reduce the shortfall was through attracting home expatriate personnel and others from overseas, who through their skills and experience could make a significant contribution to the most dynamic and rapidly growing industry world-wide.

With the fastest growing economy in the EEC and the lowest density population, Ireland has a lot to offer to the prospective immigrant and his family in terms of personal freedom, quality of life and a relatively stress-free environment in which to bring up one's children and enjoy leisure time.

I could conservatively estimate that at least 6,000 new jobs will be generated in 1980 alone for electronic technicians and technologists in the manufacturing sector of the industry. With the growth rate now exceeding 30% in the home computer market, it is estimated that the shortfall of computer personnel at the basic level of computer programmer alone will be in excess of 400 a year for at least the next five years, which brings us to 1984.

As an indication of the level of activity currently influencing developments, the following projects are an example of the level and calibre of work and commitment on the part of the government through its agency, the Industrial Development Authority (IDA):

● **Moskex.** The Dallas-based Moskex Corp set up an advanced plant in North Dublin testing microprocessors in July, 1979. Total capital investment is about £42 million. Plans are to manufacture silicon chips in early 1980 and the total employment should reach 1,200 by 1984.

● **Digital.** The Digital Equipment Company is now operational in its new plant at Clonmel and employment there is ex-

pected to increase from its current level of 50 to over 500 by 1983. Employment at the Galway plant is in excess of 1,000.

● **Amdahl.** Amdahl will shortly move to a permanent plant in North Dublin from temporary premises, and its employment level rise from 250 by end-1979 to over 750 by 1983.

● **Verbatim.** Verbatim Corp, a manufacturer of removable magnetic data storage media, has set up an Irish-based facility in Limerick. It manufactures such products as cassettes, data cartridges, floppy discs, mini-cassettes, magnetic cards and mini-discs. Currently employing more than 100 people, the company has plans to build a five-story complex at the Ruheen industrial estate in Limerick and expand to 1,400 people in employment by 1986.

Another area in which the IDA is contributing to the growth of computing in Ireland is that of incentives to the software industry to establish business units in Ireland, particularly with an export bias.

Through its Entrepreneurial Scheme, the IDA has encouraged the formation of locally based businesses such as the recently formed Interactive Computing Limited, a Digital agency and PDP-11 based interactive bureau, which over the next two years will probably employ a staff of at least 20 computer professionals.

The small business systems market is now a major growth area. In 1979 alone, one manufacturer plans to install 50 systems for new users, and it is conservatively estimated that a total of over 200 systems will be installed for new users country-wide this year.

Against this background there is a recognisable opportunity for computer manufacturers and suppliers, most of which are expanding. Others new to Ireland such as Hewlett-Packard, Redifon, and the Computer Machinery Company are now establishing

organisations here to compete for this substantial business, thus creating a further demand for computer personnel.

The momentum of these events has taken some time to build up and many organisations, including governments, tend to act after the event. However, the significance and importance of these developments in terms of added value and employment to the economy is now well and truly understood by the Irish government, and through its agencies it is also making additional funds available and developing programmes to increase education levels and encourage the participation of overseas personnel.

The following are examples of some of the projects:

● **The IDA** has recently allocated some £3 million to the universities and technical colleges to encourage them to expand their computer education programmes.

● **As part of the incentive to attract Moskex to Eire,** the Irish government is funding a £1 million electronics laboratory, to be located within one of the universities or regional colleges of higher education.

● **The recent National Manpower programme,** advertised widely in the UK and entitled *The Good Life*, is an example of the recognition of a need to attract overseas personnel.

I understand that the government will now subsidise relocation costs for personnel offered employment in Eire to the extent of approximately £2,000 per family.

● **AnCo (the Industrial Training Centre)** was recently allocated an additional £1.7 million in the funds for the purpose of increasing its training facilities for electronic and computer personnel.

Two bodies which also reflect a growing community awareness are the Irish Computer Society and the CIJEC.

Under the committed and energetic guidance of the

newly elected chairman, Owen Dalton, the Irish Computer Society is upgrading its image to relate to the needs of our expanding DP community. It acts as an interface to the EEC and is currently instituting a drive to encourage new members.

The society's education sub-committee has produced two excellent reports, entitled *Crash Training Programme for Computer Programmers*, and *Proposal for Infra-Structure of Com-*

puter Courses and Qualifications.

The Computer Industry Joint Education Committee, CIJEC, was formed in late 1978 in an effort to accelerate and influence the provision of education facilities by the government through universities, colleges and schools. It is composed of representatives of most if not all of the organisations associated with the computer industry.

The organisations are the Irish Computer Society, the

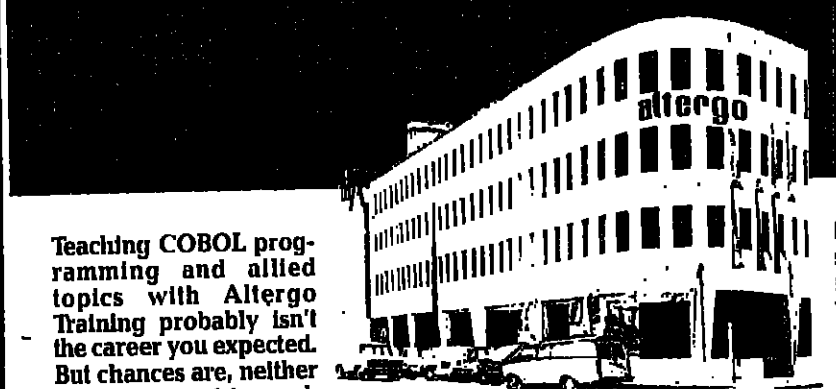
Irish Federation of Computer Users, the Confederation of Irish Industry, the National Board of Science and Technology, the Irish Computer Services Association and the Irish Business Efficiency and Trade Association.

To summarise, then, the clear message to our expatriates and overseas colleagues is that in Ireland today there are significant opportunities for career advancement in secure

employment and chances to expand your experience.

Salary and income packages are also geared to attract the professional and are conservatively estimated to be at least 20% higher than for comparable positions in the UK. This trend is evident in Figure 1, which serves to illustrate some typical income levels. Obviously these can only be taken as a guideline, as approximate mid-points in salary bands have been used.

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Position	Salary band	Bonus	Total income	Fringe benefits
Manufacturing manager	£12,000-£16,000	Possible year-end 10%-20% of gross	£16,000	Company car
Product engineer	£8,000-£10,000	Possible year-end 5%-10% of gross	£10,300	Car allowance
Data processing manager	£11,000-£14,000	Possible year-end 7%-10% of gross	£13,000	Company car
Sales	£6,000-£7,000	£6,000+	£12,000+	Company car
Systems analyst	£7,300-£8,300	—	£8,000	Car allowance £30-£120 p.m.
Programmer	£6,300-£7,300	—	£7,000	Overtime paid
Engineering manager	£8,000-£9,000	—	£8,600	Company car
Senior engineer	£6,000-£7,500	—	£7,000	Company car Overtime paid
Engineer	£5,000-£6,500	—	£6,000	Company car Overtime paid

Figure 1. Table of possible income achievements.



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Further particulars and application forms which must be returned by August 27th may be obtained by telephoning Whiteabbey (0231) 85131, Ext. 2243 or by writing to:

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The top job will be taken by an experienced D.P.M. seeking a change for more challenge and responsibility or a SENIOR ANALYST/PROGRAMMER seeking his first step into management. In either case, you should have a wide commercial and D.P. background coupled with a strong desire to succeed in a management role.

First-class Programmer/Analysts with 2 to 3 years' experience of RPG II and/or COBOL, programming and some systems design experience are required to join this small but enthusiastic department to develop and implement our on-line systems.

For an immediate interview ring or write JIM FORT quoting reference CW 0208/2.

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HUTTON HOUSE,
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LONDON EC4Y 8HP.
TELEPHONE: 01-352 7141
(24 HOURS)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

Administrative Communications Officer

Applications are invited from candidates wishing to join British Rail as its Administrative Communications Officer. This is a new post, which forms part of BR's newly formed Internal Consultancy Services Department, and is based at London, King's Cross.

The successful candidate will be expected to oversee a number of project teams working at HQ and in the BR Regions on both conventional and more advanced studies in the administrative communications field. In particular, he or she will supervise the development of Video Word Processing applications on BR, possibly networked into BR's internal communication systems.

Candidates should be graduates with relevant development and application experience in the office automation, data processing and/or telecommunications areas. There are extensive opportunities for career advancement in any of these fields. Commencing salary will be in the range of £7,010 - £8,781 and there are generous free and reduced rate rail travel facilities. There is also a contributory pension scheme and the transfer of existing pension rights can, in most cases, be accepted.

Applications stating age, education, qualifications and experience should be addressed to:

Headquarters Staff & Services Manager,
222 Marylebone Road,
London NW1 6AJ.
(quoting ref: RB.611)

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We have several immediate and future vacancies in Sussex for people with sound Intel 8080 experience.

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Call Neil, Suzy or Richard
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£10,000 PA

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Our Client is a well established Company backed by a major Airline with world wide interests. Their products include total information systems using mini and mainframe computers, system consultation and software. Their customers cover a wide range of companies in a variety of industries including major Industrial Organisations. The Company's applications experience is substantial, their particular strength being in the financial, management and accounting areas and through its close connection with the Airline has vast experience in the travel, Hotel and real-time reservation areas.

There is NO UPPER LIMIT and the potential is there to earn £20,000 per annum.

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You may be a Systems Analyst wishing to sell in a consultancy environment or a computer related Sales Executive wanting a career with room for advancement and high earnings based upon effort.

Ambitious - inquisitive - flexible in attitude - a positive thinker - sociable - a good communicator. The ability to feel at ease with people at all levels is essential.

A salary of £8,000 will be paid together with a substantial guarantee which will be paid during intensive training incorporating a visit to THE UNITED STATES.

A two litre car will be provided (or £1,500 per annum) plus other company benefits.

IF YOU WANT TO STAND OUT IN THE CROWD - GET TO THE FRONT

FOR AN IMMEDIATE AND CONFIDENTIAL INTERVIEW CONTACT SIMON LEVER ON: 01-935 0671 (24 HOUR ANSWERING SERVICE) OR: WRITE GIVING BRIEF DETAILS.

London 01-935 0671 3 Mandeville Place, Wigmors Street, London W1M 5LB
Birmingham 021-238 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

Specialist Computer Recruitment Ltd

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SENIOR SALESPERSON to £10k Basic

Small but expanding Computer Bureau based in Warrington. Subsidiary of large group. Need a mature and experienced person to sell bureau services. Working on a realistic quota basis. Total earnings could be much higher. A 2 litre car will be provided. Mortgage facilities can be made available.

SYSTEMS ANALYST £6500 + Bonus

Engineering Company based close to City Centre. In process of upgrading to an IBM 370 installation. Wide variety of applications. Should have around 18 months/2 years Systems experience preferably with a background in programming. Early finish Friday.

SENIOR PROGRAMMER c £6000

Fast growing part of a multi-national group based in North Manchester. New vacancy caused by expansion. IBM 370/138 under DOS/VS. Responsible to the Project Leader for analysing, designing and documentation of programs from systems specs. Excellent opportunity for Programmer with over 3 years COBOL experience. Batch and on-line financial and commercial systems.

SYSTEMS ENGINEERS £6k to £8k

Support and development of Univac services. Should have Univac 1100 or other relevant experience, and have worked in one of the following fields:- OS 1100 Support, Compilers (COBOL, FORTRAN), Libraries, Utilities, Package Support and Development, Hardware and Terminal Facilities Planning and Implementation.

JUNIOR PROGRAMMER c £4000

Multi-national group. IBM system 3 model 15 with T.P. network. Small installation where individuals count. Programming in RPG2 for stock control, purchase order and sales statistics applications. Good chance for a young person with around 12 months experience to broaden experience and to be trained with a view to management.

To register for these and many other vacancies, please contact:

Alan Brown (Manager)
SENIOR APPOINTMENTS COMPANY
(Computer Division)

Coronation House
Ardale Centre
Market Street
Manchester
Tel. 061 832 4393

The British National Oil Corporation has, within its Computer Department, a challenging opportunity for a Technical Project Leader who will lead a small team of analysts in support of the computing requirements of the Petroleum Engineering Division. This position offers real scope both for creative technical work and for management development.

The position requires an enthusiast with 8-10 years' experience in a technical group together with a degree in engineering, computing or mathematics and preferably with further postgraduate qualifications.

You would be joining an expanding and enthusiastic Computer Department, which is involved in developing

in-house facilities based on HP 3000 and ICL 2900 equipment. As a senior member of the department you would be expected to make a significant contribution to this development. The job is based at Corporation headquarters in Glasgow but will involve frequent travel within the UK.

The remuneration package will fully reflect your own ability and the status of the post and other excellent benefits include an attractive pension, free life assurance scheme and, where appropriate, generous assistance with relocation.

For further details and an application form, contact:-



The Recruitment Officer,
The British National Oil Corporation,
160 St. Vincent Street,
GLASGOW, G2 5LJ.
Telephone Number: 041-204 2525.

The closing date for receipt of applications is 24th August 1979.

The British National Oil Corporation

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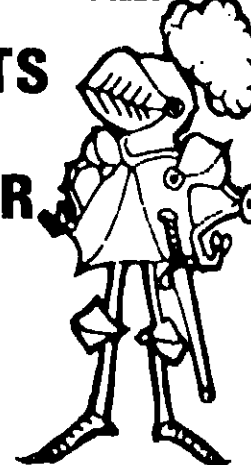
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For details of these and other contracts please contact
JUDY LEES/LYNN BARTON on 061-833 9341/5 (24 hrs.)

HONG KONG POLYTECHNIC

The Hong Kong Polytechnic is an expanding institution which is now putting into effect a forward-looking development plan incorporating a credit-unit approach combined with a self-learning system. The basic teaching departments are organised into three divisions — Engineering, Applied Science and Commerce & Design, and broad, inter-disciplinary centres and institutes. Textiles & Clothing and Medical & Health Care, which are relevant to the needs of Hong Kong.

The Polytechnic invites applications for the following posts which are available from 1st September 1979.

Senior Lecturer / Lecturer

Department of Computing Studies

The Department offers courses leading to the award of a diploma in Computing Studies, a Higher Diploma in Computing Studies and a Higher Diploma in Systems Analysis. The first two under a credit-unit system. More advanced work is being planned. In addition the Department services other Departments in computing, there being currently 5,000 registered computer users in the Polytechnic.

The Department's own courses are, at present, commercially oriented. Considerable emphasis is placed on practical training, normally achieved by placing students in local companies. Over 200 interactive terminals are available on campus, with plans to increase this number to 300 by 1980/81. In addition substantial batch processing facilities are available. Successful applicants will have experience in one or more of the following areas: Advanced COBOL, Advanced Systems Analysis, Systems Programming, Real Time Systems, Project Management and Control, Data Base Management Systems, Advanced Management Information Systems, Computer Organisation and the use of Computers in Inventory Control, Production Control, Office Automation, Banking and Insurance.

General Qualification for Appointment:
Senior Lecturer: (a) a degree or professional qualification, plus preferably an advanced specialist qualification; and (b) at least five years' professional experience; and (c) substantial teaching and/or industrial/commercial experience (about 3 additional years); and (d) proven administrative ability.

Lecturer: (a) a degree or professional qualification or at least a Higher Technician qualification in the appropriate field of study; and (b) at least five years' professional or industrial/commercial experience or at least three years' teaching experience or a suitable combination of professional and teaching experience.

Salary Scales:
Senior Lecturer: HK\$107,340 p.a. by 11 increments.
Lecturer: HK\$44,220 to HK\$79,550 p.a. by 11 increments.
Note: (1) - HK\$11,800 on 1st July, 1979.
(Commencing salary will be commensurate with qualifications and experience.)

Conditions of Service:
Appointment will be on a two-year fixed-term contract terms initially. Thereafter suitable appointments may be offered further contracts or renewable terms of service at the discretion of the Polytechnic. Benefits include long leave, free passages, subsidised accommodation, medical and dental treatment, children's education allowance and a terminal gratuity equal to 25% of basic salary received over the entire contract period.

Application forms and further information are obtainable from the Hong Kong Government London Office, 6 Grafton Street, London W1X 3LB, UK. Completed application forms should be returned to the same office by 27th August, 1979.

Systems Analyst

HERTS.

Up to £8000 p.a.

With our sales team hitting all-time records, Everest is rapidly expanding to meet the growing market of house owners improving their homes by buying our double glazing products.

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The successful candidate will be a self-starter with experience which will enable them to carry through new projects on initial feasibility to final implementation as well as improving and extending existing systems in all commercial areas of the company. With the knowledge and experience gained in most departments, they will in time be ideally equipped for progression to more senior appointments in the company.

A high salary, 4 weeks' holiday, staff discount, generous pension scheme — these are some of the benefits as well as re-location help to a very attractive part of the Home Counties.



Brief personal details to: J. R. Stredwick, Personnel Manager, Everest, Gillingham, Dover Road, Cuffley, Herts. Tel. Hatfield 6353.



WHITBREAD WESSEX LIMITED COMPUTER OPERATOR

To maintain the department's operations we are seeking to appoint a COMPUTER OPERATOR for our Computer Centre in Portsmouth which provides services to Whitbread Wessex Limited based on a Honeywell 64/30 Mainframe and 718 systems, and a Ventek Datapoint system.

The main duties of this position will include carrying out the operating requirements of four computers under the direction of a Shift Leader, the documentation of all Computer Room activities, and the production of work according to a pre-defined schedule. A two shift system Monday to Friday is involved, and some weekend working will be necessary.

The successful applicant will have at least 18 months' computer operating experience, be aged 23+ and have a proven aptitude for the work.

We offer a competitive salary, generous shift allowance for a 40 hour week, and excellent fringe benefits.

Please write giving brief details of qualifications and experience to date to:

Miss C. Wilkinson
Personnel Officer
Whitbread Wessex Limited
P.O. Box 3
The Portsmouth Brewery
PORTSMOUTH PO1 3LD

Systems Analyst

c. £7,200

Having formulated a company data base we are now carrying out a user training programme so that we can develop our manufacturing and management control systems.

We need someone with analyst experience who could develop their career alongside our computerisation programme.

For further information please contact:

The Personnel Officer,
Zenith Carbuter Co. Ltd.,
Honeypot Lane,
Stanmore,
Middlesex.
Tel: 01-204 3388

ZENITH

Gwent college of higher education

SENIOR LECTURESHIP in Computer Studies

Salary range: Senior Lecturer — £5007 — £7761 — £8853

Applications for the above post are invited from graduates in appropriate disciplines who have experience in computing, and particularly in areas such as C.I.L. and C.M.I. The successful candidate will have an active interest in the application of computer technology to education and training. The background of the successful candidate will be in education. He/she will have a leading role in the development of computing studies in the College and will be expected to teach on various Computing Studies courses in the Faculty.

Further particulars and application forms, which must be returned as soon as possible, are available from:

Principal, Administrative Officer, Gwent College of Higher Education, College Park, Newport, Gwent, NP23 5TA. Telephone: Newport (0453) 421282.

Applications will be made to the Gwent Education Board (0453) 41225.

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CREATIVE SYSTEMS AND SOFTWARE PROFESSIONALS working in LONDON, PARIS and MUNICH

Our growing software and systems division undertakes varied and technically challenging assignments. You will be working with management so you will need eloquence, confidence and initiative. Needless to say, spoken French and German would be useful (English is mandatory). The work will include:

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oriented to basic software, networking and sophisticated applications for mainframes, minis and micros.

Although it is unlikely that those with less than five years' experience will meet our requirements, if you think you are the exception that proves the rule, let us know. Please write, including résumé, salary history and location preference, to:

G. R. S. Bingham—GSI Systems
83 Clerkenwell Road, London, EC1R 5HP
Tel: 01-242 0747

Générale de Service Informatique (UK) Limited is an equal opportunity employer.



Computer Information Officer

Within the Computer Sciences Department, our Medical Statistics Unit is responsible for providing statistical and computing services for new and established products, primarily for clinical trials conducted world-wide. The Company has a new PRIME 400 computer on which a good selection of software packages are available and a range of statistical software including GLIM and SPSS. A good knowledge of FORTRAN is a pre-requisite.

You should be a qualified graduate in computer science with an interest in information systems, or qualified in Information Science with substantial knowledge of computing. To take major responsibility for the development and operation of a new on-line system designed to provide information about the progress of clinical trials, and be expected to make a substantial contribution to the on-going development of our patient data systems. Starting salary in the range of £4050-£4850 per annum including London Allowance. Point of entry according to qualifications and experience. There are annual bonuses totalling 10% and a non-contributory pension scheme. Assistance with relocation expenses is available in appropriate cases.

Please apply to: R. E. Nolan, Personnel Officer, Glaxo Group Research Ltd., Greenford Road, Greenford, Middlesex, quoting ref. FY274.

Glaxo Group Research Ltd.

university college of SWANSEA

Full-Time/Part-Time Programmer

Applications are invited for the vacancy of Full-Time/Part-Time Programmer in the Department of Clinical Engineering to provide programming support on a S.I.C. Executive Computing Facility. The position is based on a PDP 11/40 running under the RS/11M operating system. Duties will be mainly concerned with providing a program advisory service for research workers, together with some application programming. Applicants should preferably have a degree or equivalent qualification in computer science, engineering or mathematics, with good knowledge of FORTRAN. Participation in DEC training courses may be arranged.

The appointments will be for up to three years in the first instance, from the account date that can be anticipated. The salary scale is from £2,178 p.a. on the scale £2,776-£3,585 per annum, or £1,000 p.a. for Part-time plus U.S.D.P. benefits. The commencing salary, depending on age and experience.

Further particulars and application forms are available from:

Principal, Administrative Officer, Gwent College of Higher Education, College Park, Newport, Gwent, NP23 5TA. Telephone: Newport (0453) 421282.

Applications will be made to the Gwent Education Board (0453) 41225.

DATA PROCESS SUPERVISOR

A Public Company requires for its North West London subsidiary a Data Processing Supervisor/Analyst to operate its computer systems. After a period of familiarisation it is envisaged that further work in developing programmes for the Group as a whole will be undertaken.

The successful candidate (male/female) will probably be a graduate with a computer sciences degree or statistical training to degree or HNC level seeking to gain experience in operational analysis.

Salary will be fully commensurate with the responsibilities of the post together with fringe benefits which include a contributory pension scheme.

Applications with details of background and experience to:

Group Personnel Consultant
BLADEN & ROAKES (HOLDINGS) LTD.
16/18 Hutton Garden, London, EC1R 5PJ

This is your opportunity to be in at the start

Planning Research Corporation is a \$250m international consultancy enterprise with Commercial, Industrial, Governmental and Military interests. The Management Sciences Group is undertaking a major expansion programme to develop the U.K., Europe and Middle Eastern markets. The first projects are underway and we have an immediate requirement for dedicated professionals in the fields of programming, systems analysis and telecommunications.

Your involvement with us at this stage of our market development will provide excellent opportunities for professional growth world-wide.

CENTRAL LONDON — IBM 370

We are setting up a major Cost Information System supporting planning and budgeting for the total construction of two new cities in the Middle East. It is based on IBM 370's on site and in London.

Programming Manager £8,500

Analyst/Programmer, 5 years' experience, IBM 370 OS/VS1 or VS2, TSO (with experience in writing/designing CLISTS). FORTRAN required, COBOL desirable. A Scientific or Engineering background and a degree are preferred with at least two years' in lead role over 5 or more programmers. Proven experience in systems analysis and design is required. You will be required to travel to the Middle East to perform the installation of the system.

Team Leaders c£6,500

Programmers/Analysts, 3 or 4 years' experience. IBM 370 with OS and VS1 or VS2 required, plus FORTRAN and Time-sharing Option experience required. COBOL is desirable. A scientific background, plus degree would be useful, but not vital. At least one year in the lead role over two or more programmers needed.

Programmers c£5,000

One or two years' programming with FORTRAN required, IBM 370 OS experience desirable.

SOUTH EAST BELGIUM — Honeywell 6000

We are converting a large Military command and control IBM 360/50 installation to Honeywell 6000.

Programmers/Analysts c£27,000

plus relocation
We are looking for two years' experience on each of TDS, IDS, and COBOL. One year's systems development and programming experience with Honeywell 6000 are expected. Applicants should be U.K. nationals.

Initial contract term is 12 to 18 months. Salary payment will be in the range of \$18 — \$20,000 p.a., plus 50% cost of living allowance. A relocation assistance payment of up to \$5,000 will be made.

BRUSSELS — Telecommunications Systems Engineers and Technicians

In line with our market development we are recruiting Hardware and Software Engineers and Technicians.

We need familiarity with a broad range of telecommunications hardware and software techniques and equipment. Operational areas are communications controllers, concentrators, MODEMS, multiplexors, P.C.M. and carrier equipment; store and forward, packet switching and polling methods and disciplines. Military communications background is useful.

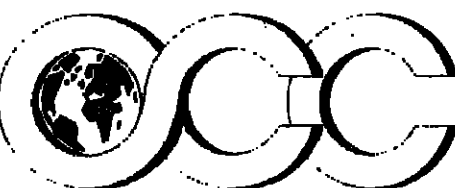
Salaries will be highly competitive and negotiated on experience.

We are being assisted by Charles Barker-Coulthard who are conducting initial interviews.

Please write with full details, or telephone for an application form, quoting reference 966/6 to Charles Barker-Coulthard Limited, 30 Farringdon Street, London EC4A 4EA. (01-236 0526).

prc

Planning Research Corporation International



Specialists since 1971 in UK and international computer appointments. We have many other vacancies in the UK and throughout the world, apart from those shown here, and offer a career counselling service to computer professionals.

Systems Controller to £7,500 - Car

- Warwickshire
- Manufacturing
- New post

This small engineering company currently uses a mini computer for a limited range of commercial accounting applications. The company, which has recently joined a substantial diversified group, now wishes to implement production planning and control systems; using the hardware and technical resources of the group.

The Systems Controller will be the top DP person and will report to a Senior Manager, whilst having close working links with the Group Systems Manager.

The position requires a systems background, preferably with experience of production systems. Whilst the person appointed must be technically competent, a determined and persuasive personality is of equal importance. Relocation expenses will be paid.

To apply, please write or ring, asking for Neville John on 01-242 9356 (day) or Farnborough (Kent) 52880 (evenings and weekends), quoting Ref: 757/CV.

OCC Computer Personnel Limited
18 Bedford Row,
London, WC1R 4EB
Telephone: 01-242 9356



SOFTWARE LONDON W.1

TEAM LEADER

Up to £8750

SOFTWARE PROGRAMMER

Up to £7750

You are working in a software support or development role, but are now considering a move, perhaps to gain wider experience or to improve your earnings.

You could well be interested in joining our clients software group (near Oxford Circus) which provides technical support in a major ICL 2980 installation. The interesting features of the job are:

- Variety — including working an operating system enhancement, performance measurements, TP and IDMS software, and providing technical support to users.
- Training in TD and IDMS where necessary.
- Potential for creative people to make a positive contribution.
- The technical challenge of advanced systems
- Sound career progression opportunities.

This opportunity will interest programmers with software experience on ANY MACHINE, using a major operating system. Our clients will provide retraining if required. Candidates for the Team Leader post should have leadership experience or capacity.

Please ring us for a confidential talk, quoting ref. CW 704 for the Team Leader post and CW800 for Software Programmer. Alternatively leave a message on our answering machine and we'll contact you.



EDP SYSTEMS 01.637
52-53 Margaret St. London W1N 7FF 5796

CAPP ASSOCIATES group provides permanent and contract recruitment services to clients and applicants

Below are just a few jobs currently available. If none of them suit your experience, contact us and tell us what you want.

With our experience, if we can't help you - WHO CAN?

DATA CONTROL SUPERVISOR	OS JCL	W.1.	C £7,000	Flexitime
PRODUCTION CONTROLLER	G II/VMEB	W.4.	C £6,000	DAYS
IBM SHIFT LEADER	370/DOS	CITY	£5,500 +	Benefits
IBM OPERATOR	DOS/POWER	CITY	£5,000	BANK
ICL OPERATOR	MANUAL	SURREY	£4,600	2 shift
HONEYWELL OPS	OS 2000	SOUTHAL	£4,500	2 shift
IBM OPERATOR	OS/VS1	ESSEX	£4,500	3032
JUNIOR OPS.	6 mths exp.	Various	£ Neg.	

Contact PATSY BARNES at CROYDON for further information

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF: CW106-0P

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS **CAPP ASSOCIATES** LONDON AND MANCHESTER  01-686 9693 A.M.P. HOUSE, DINGWALL RD., CROYDON, CR9 2AU



SOFTWARE PROGRAMMER KINGSTON

Due to continuing expansion within the SYSTEMS DEPARTMENT, we have a vacancy for a SOFTWARE PROGRAMMER with mini experience.

The Department currently operates an ICL 1906S - 384K, under George 3. An ICL 2980 and a range of mini-computers are used for new systems development.

The requirement is for a SOFTWARE PROGRAMMER with at least one year's experience to work on development of a network of minis, communicating with mainframes.

The successful candidate is likely to have the following:

Programming experience on a mini (high level language or assembler), preferably PDP-11 or VAX-11 under standard operating systems.

A relevant degree or professional qualification.

The ability to communicate with management, users and engineers.

This is a responsible position offering an attractive salary based on experience, and ample opportunities for career advancement. In addition the Corporation offers a Pension and Life Assurance Scheme, a Sports and Social Club (Squash, Football, Sailing, Licensed Bar etc.), excellent canteen facilities and, where appropriate, generous assistance with relocation expenses.

Please write with brief essential details, or telephone for an application form quoting CW/25 to: The Personnel Officer, BRITISH AEROSPACE, Aircraft Group, Kingston-Brough Division, Richmond Road, Kingston upon Thames, Surrey KT2 6QS. Telephone: 01-846 7741.



ELECTRONICS ENGINEER FOR SWITZERLAND

We are looking for an electronics engineer, age 24-32 years, with good experience in microprocessors and, if possible, in after-sales service. Knowledge of French or German would be an asset.

The after-sales service of a future electronic typewriter and word processing units requires the preparation of:

- technical documents
- technical training of field technicians,
- testing units
- technical correspondence

This is an extremely varied and interesting activity collaborating with the research and development office, the sales and after-sales network in Switzerland and abroad.

Write or telephone:

Mr. Miller
Hermès Prestige Ltd.
Béchard Road, Colchester CO2 7QH
(0206) 48221

PROGRAMMER/ STATISTICIAN AUDIENCE RESEARCH DEPARTMENT

£4,525-£6,225 p.a.

The BBC is looking for a PROGRAMMER/STATISTICIAN for the Statistical and Computing Systems section which is currently involved in designing, implementing and maintaining systems for the processing and statistical analysis of social survey data, using BBC's ICL 2900 and 1900 Series computers. The person appointed will assist in this work by developing computer programmes required, tackling special analysis problems which may arise and occasionally advising department's researchers on analysis of data. Applicants should have formal training in statistics, sound knowledge of PROGRAM, experience in programming ICL 2900 Series knowledge of ICL 1900 Series and PLAN desirable.

Starting salary in accordance with qualifications and experience. Relocation expenses considered.

Telephone or write immediately for application form enclosing addressed envelope and quoting reference no: 1530/C to Appointments Department BBC, London W1A 1AA. Telephone: 01-580 4468. Ext: 4619.



TELCON METALS LIMITED Manor Royal, Crawley

The Company is part of the BICC Group of Companies and manufactures high precision alloys for a wide range of industries including electrical, electronic and automotive and have a vacancy for a

DATA PROCESSING MANAGER

to take responsibility for a Small Data Processing and Systems Department using an ICL 7502 and 7503 connected to a 2980 running under DME in the north-west of England.

Responsibilities will include all development, running and maintenance of a wide range of applications together with supervision of the O & M Function.

The position will suit a person who has management experience coupled with a background in analysis and programming. Every opportunity will be given the selected applicant to extend their knowledge of management and project leadership.

Assistance towards relocation expenses will be given where appropriate. Salary £8600-£7000.

Write, with full CV to:
Mr. J. W. Ward, Personnel Manager
Telcon Metals Limited
Manor Royal, Crawley, West Sussex
Crawley BN6 8DD.

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- EMPLOYEE BENEFIT STATEMENTS
- PERSONAL FINANCIAL ADVICE
- PROFIT-SHARING SCHEMES
- MANAGEMENT INCENTIVES

Noble Lowndes and Partners Ltd.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW 165-9H

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS **CAPP ASSOCIATES** LONDON AND MANCHESTER  01-686 9693 A.M.P. HOUSE, DINGWALL RD., CROYDON, CR9 2AU

Product Marketing Executive Data Communications

Racal-Milgo Limited is a world leader in the field of data communications, and supplies a comprehensive range of sophisticated equipment to computer based users.

The Company's European sales and marketing headquarters will be shortly relocating to Fleet in Hampshire and has immediate vacancies for Product Marketing Executives.

Successful candidates will join a dynamic team of young professionals and report to the product marketing manager. Responsibility will be given for specific product areas and this will entail liaising with engineering, manufacturing and sales departments in order to ensure that technical and commercial product plans are met

from initial product specifications through to market release. Covering all aspects of marketing and high technology product line the positions are both challenging and rewarding.

A technical background in data communications systems/products is essential and some commercial experience would be advantageous.

The positions carry an attractive salary and benefits package, so if you think you have something to offer write with brief details to:

D. J. Kichenside, Personnel Officer,
Racal-Milgo Limited,
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or ring Reading (0734) 595314.

Britain's fastest growing electronics group



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£2,000-£17,000

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IMMEDIATE REQUIREMENTS: DOS & OS
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OPERATORS — HOME COUNTIES



IBM

£5200

SHIFT LEADER

3 years 370 experience using DOS/VS and a sound knowledge of a TP network are essential requirements for this responsible position. Large North London company offers excellent working conditions and benefits.

To £4100

SENIOR OPERATOR

Twin 370s running under OS/VS1 operated at this busy N.W. Kent installation. 2 years' minimum experience rewarded with good career prospects and excellent benefits.

To £4500

OPERATORS

At least 1 year SYS 3 experience required. Excellent benefits apply.

£4000-£4500

ICL

OPERATORS

With minimum 12 months George 2 or George 3 experience on 1900 or 2900 needed by this Central London client. 10% salary review under negotiation and plenty of overtime opportunities, as well as subsidised restaurant. Large installation offering good career path to the ambitious.

To £5200

HONEYWELL

SHIFT LEADER

Required with in-depth knowledge of Level 64 GCOS and good managerial abilities to handle a busy shift. Central London company offers first-class career prospects and large company benefits.

£4000-£4500

OPERATORS

To complement the above position with good knowledge of GCOS preferred. Same large company benefits apply.

These positions are typical of our current quality opportunities so if you are considering a move, whether it be on a permanent or freelance basis, please contact BRIAN POSTLES at

Accord Computer Efficiency Ltd.
Portland House
4 Great Portland Street
London W1N 5AA
Tel: 01-687 8001
01-580 37 54
Tlx: 281334 ACE UK
Licence No. 85(A)3320



975-03104P

EUROPEAN CONTRACTS

BELGIUM

We are currently staffing a project in Belgium for a DIS-MVS conversion.

PROJECT LEADER/DESIGNER

Commencement October 1st

Must have DOS and MVS with ASSEMBLER programming experience. Will be involved in the design and structuring of the project. Specialists only need apply.

ANALYST/PROGRAMMERS (3)

Commencement December 1st

Heavyweight professionals with PL-1 and MVS expertise. As the above contracts carry substantial rates, telephone us as soon as possible for more information.

HOLLAND AND BELGIUM

Several IMS Database Designers needed. Top rates.

GERMANY

Real time MINI ASSEMBLER Programmer needed to design and code a Stock Automation System for the car industry. Location Frankfurt.

Commencement September 15th for 6 months. Very good rate. Some German required.

For further information on these positions please contact:

Alan Whitford
Accord Computer Efficiency Ltd.
Portland House
4 Great Portland Street
London W1N 5AA
Tel: 01-637 5001
01-580 3754
Tlx: 261334 ACE UK
Licence No.: SE(A)3320

CROYDON COLLEGE

Field, Croydon CR9 1DX
COMPUTER STUDIES
DEPARTMENT

Applications are invited from suitably qualified persons for the following post duties to commence 1st September, 1979

PART-TIME LECTURER IN COMPUTER- STUDIES

Part time day and evening Lecturers are required to teach computer programming, systems analysis and computer application. Teaching or commercial experience in computing essential.

Further details and application forms may be obtained from the Vice-Principal to whom completed forms should be returned within fourteen days of the appearance of this advertisement.

UNIVERSITY OF YORK

Department of Computer Science

ELECTRONICS TECHNICIANS GRADE 5

Applications are invited for the above post to start staff and students in their teaching and research activities. The post principally involves designing, constructing, testing and maintaining electronic equipment in the digital systems laboratory.

Applicants should have some experience of digital electronics and an appropriate qualification. No knowledge of specific computer language is required as training will be given. Salary on Grade 5 £3,474-£4,056 p.a. (under review).

Applications in writing giving the names and addresses of two referees, and specifying the post to which application relates should reach the Deputy Bursar, University of York, Heslington, York YO1 5DD, by Wednesday 15 August 1979.

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seeks experienced
**IBM 34
SYSTEMS
OPERATOR**

Top salary for right person
Write with C.V.
Box 1046 CW

An Opportunity in training

Honeywell Dual 66/40 installation.

Standard Telephones and Cables seeks a young ambitious computer professional to fill a vacancy for a Training Officer in its Information Systems Division.

The Information Systems Division supports an expanding communication network of terminals and mini computers with plans for significant increases in distributed systems.

The Training Officer is required to present courses on subjects including Computer Concepts, Job Control Language, Programming, Financial Modelling and Time-Sharing Operation and also to provide on-the-job training during mini-computer installation.

A solid data processing background is required combined with some experience of the preparation and presentation of training material.

A competitive salary is offered along with large company benefits, the location is the North London/Herts border. Please telephone or write to Mrs G Lavelle, Ref. REB7, Recruitment Department, Standard Telephones and Cables Limited, Oakleigh Road South, New Southgate, London N11 1HB. Tel 01-368 1234 Ex. 2263.

STC Changing the face of communications worldwide

International Oil Exploration and Production PROGRAMMER

Unionoil Company of Great Britain, a subsidiary of Union Oil Company of California, wishes to engage a Programmer for the Computer Services Department at the Sunbury-on-Thames Head Office. This position, in a recently established department, offers a unique opportunity for professional challenge and scope.

Initial responsibilities include commercial programming for accounting and management information reporting systems. Candidates should have 'A' level qualifications and two to four years' experience with Cobol. Familiarity with Fortran or Basic would be an advantage.

This position offers an excellent salary and benefits package and interesting career opportunities with an international oil exploration and production company.

Additional benefits of this position will be the experience gained on our in-house computer, which currently controls an on-line and multiple site environment.

Interested persons should respond in writing to the address below. All responses will be held in strict confidence.

Administrative Services Department,
Unionoil Company of Great Britain,
32 Cudbury Road,
Sunbury-on-Thames,
Middlesex.
Telephone: Sunbury 85600.

UNION

UNIVERSITY OF KENT AT CANTERBURY COMPUTING LABORATORY

SHIFT LEADER

We need an experienced Computer Operator to lead a three person alternating shift operating the Laboratory's ICL 2950.

Salary scale £3,818-£4,065 + £2.85 for each evening shift worked. (Under review).

Application forms and further particulars may be obtained from H. R. Clayton, Senior Assistant Registrar, The Registry, The University, Canterbury, Kent CT2 7NZ (Tel Canterbury 68822 Ext 263), quoting reference M79/13, to which completed applications should be returned not later than 24 August 1979.

RPG II PROGRAMMER MARLOW, BUCKS

A new position has been created for a programmer to join a small team within an expanding D.P. Department, shortly to be relocated in new modern offices.

Applicants should have 12-18 months experience excluding initial training.

Current hardware is IBM System/3 Model 12 with tapes.

May 1980—upgrade to IBM System/38.

Applications include Order Processing, Finance, and a heavy emphasis on Marketing orientated projects.

Attractive salary commensurate with experience. Telephone or send C.V. to Miss Philippa Parnham, Maritz U.K. Limited, Marlow House, Institute Road, Marlow, Bucks (Marlow 72021).

LANCHESTER POLYTECHNIC AT COVENTRY

FACULTY OF APPLIED SCIENCES
Department of Statistics and Operational Research
RESEARCH ASSISTANT
(TENABLE FOR 1 YEAR)

THE JOB: will require the person appointed to assist with research in one or more of the following areas: Statistical Computing, Demography, Medical Statistics, Physical Distribution, a newly qualified graduates or research student, to be given the opportunity to gain experience of the Polytechnic sector of Higher Education.

For application forms and job specifications please apply in writing enclosing a self-addressed envelope to the Personnel Office, Lanchester Polytechnic, Priory Street, Coventry, CV1 5PB, returnable by Monday, August 20, 1979.

Computer Application Engineers

You get technical challenge and total involvement with Ford's Design and Engineering

Ford is Britain's most successful vehicle design organisation, owing much of its success to a readiness to make the fullest use of new techniques. We operate one of the most advanced engineering facilities in the country and that means that we can offer real involvement and variety to computer professionals who come and join us.

Our Product Development Group at Dunton in South East Essex, houses the complete range of activities of a modern engineering research, design and development centre. You'll be working very closely with specialist engineers to develop systems for the complete range of design processes, from stress analysis of individual components to draughting, and your expertise will have a major part to play in ensuring the success of our products.

We are now looking for computer professionals in the following areas:

Vehicle/Component Test Automation

In this area you will be responsible for specifying and providing computer or microprocessor based systems for the control and monitoring of complex test rigs and providing a service for processing in vehicle test data.

Computer Aided Engineering Methods

Here you will be involved in providing advanced computer based theoretical modelling techniques for static and dynamic analysis of components, sub-assemblies or complete vehicles.

Technical Systems Services

You will be responsible for providing

mathematical services, applications software, standard utilities, operating system and hardware support.

CAD Systems

You will be responsible for providing computer based geometric data, handling systems applicable to draughting 3D mechanical design, and surface definition.

The men and women we are seeking should be educated to degree level or equivalent, in engineering or science and should have had first hand experience of one or more of the following:

- * Computer based draughting
- * Real time scientific application
- * Finite element methods
- * Vibration and fatigue analysis
- * Dynamic simulation
- * Engineering applications programming
- * Hardware and software selection
- * Data Communications

You should be able to communicate readily and effectively as part of a professional team, and to demonstrate a co-operative and practical approach to problem solving. Bringing your talents to Ford will allow development in a technically challenging environment, where promotion prospects are excellent.

We offer excellent starting salaries dependent on your experience and qualifications. Plus the fringe benefits package which includes Ford's Special Car Purchase Plan and relocation assistance where appropriate.

If you want more technical information telephone Alan Bates in our Systems Management team on Basildon (0268) 402384 or just for an application form write to Pat Adord, Room 15/166B Ford Motor Company Limited, Laindon, Basildon, Essex. Telephone Basildon (0268) 402655.



Gold Fields of South Africa Limited

Opportunities in South Africa

Due to growth and expansion in its activities this major South African mining finance house is seeking to increase its computer staff and has vacancies at the Group's Head Office in Johannesburg for:-

*Software Programmers:

To provide system support for VME/B and to establish and maintain a reliable software environment in GFSA. 2-4 years experience required. Salary range R610-R900 per month.

*Systems Analysts:

For the design and implementation of commercial systems project control. 5 years DP experience required with at least 1 year systems experience. Salary range R725-R1190 per month.

The Company operates an ICL 2972 computer.

Attractive employee benefits are offered, including assistance with relocation expenses. Candidates appointed will normally be expected to obtain permanent residence permits but employment on a temporary work permit basis for a minimum of 2 years may be considered.

Interviews will be held in London between 29th August and 7th September 1979 at the offices of the Group's associated company, Consolidated Gold Fields Limited. Please write, with brief relevant particulars, to:-

Personnel Manager (Ref. GFSA),
Consolidated Gold Fields Limited,
40 Moorgate,
London, EC2R 6BQ.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016.

Programmers - Senior Programmers, now you can afford to buy your own home!

**The Anglian Water Authority have
vacancies at excellent salaries
in a low cost housing area.**



Modern and Traditional housing is cheaper.

The Authority's Data Centre, which houses the mainframe and development staff, is in a most attractive purpose built location in Huntingdon, on the banks of the River Ouse. Recreational facilities in the area include boating and virtually all rural activities.

Housing prices really are amongst the lowest in the country. Within close reach there is a choice of old world village accommodation or modern housing developments.

The Authority offers an excellent relocation package - that 'dream house' can become a reality.

The relocation package includes:

Removal Expenses

Agents' Fees

Leave to look for accommodation

Legal Fees

Fixtures & Fittings Allowance

Temporary accommodation Allowance

The challenge of an ambitious new project.

The Anglian Water Authority is the largest of the new Regional Water Authorities. Their

territory stretches from the Humber down to the Thames.

With responsibility for administering the water resources in a territory of this size, the demand is for the very latest thinking in computer systems and communications to provide effective control and information processing throughout 20 divisional sites. The Authority's data processing is centred round large dual Honeywell Level 66/10 machines (which are due to be replaced by 66/DPS 100's shortly).

This is one of the most ambitious projects of its type at present under way in the U.K. The equipment is of the very latest specification. The challenge of providing a computer service for a newly created organisation gives opportunities to work on really interesting projects covering literally all aspects of modern commercial and technical applications.

Job Satisfaction.

The requirement is for COBOL Programmers and Senior Programmers. The systems department provides really sophisticated facilities for program development. The environment is one of professionalism, with systems developed in a controlled and logical

manner, using modern techniques including decision table preprocessors and on-line program de-bugging. As well as the current data base applications, forward planning includes a major distributed processing network based on the dual Honeywell DPS 100 system.

City salaries for country dwellers.

The Authority recognises that to attract top people you need interesting work and top salaries.

If you think that working in a rural environment means a second class income, you will be pleasantly surprised. Salaries offered are in a range up to £6,000 per annum for Programmers and up to £7,000 per annum for Senior Programmers.

We cannot emphasise too strongly the attraction of working in this environment. If you have a minimum of one years' experience in COBOL or other modern commercial languages, we would like to hear from you to discuss the positions in more detail. Please contact Michael Sands or Sara Taverner by telephoning 01-828 5356 or writing to them at the address below. Ref. 0110/CW

John Goldsmith Computer Professionals



John Goldsmith (Computer Recruitment) Ltd.,
Asphalte House, Palace Street, London S.W.1.
Telephone: 01-888 8386 - 24 hour answering service. Telex: 918779
Recruitment Consultants
A Company of the Provident Financial Group

J. H. Sankey and Son Ltd., one of the leading builders merchants in the country, with group turnover in excess of £12m, are starting work on a major long term development plan involving distributed processing throughout the UK. The early and major part of this plan is the setting up of a centre at Berkhamsted based on a PDP11/34. This will later be extended by the use of micros in branches linked with the centre.

Analyst/ Programmer

Berkhamsted c. £7000 + company car

We require an Analyst/Programmer to work as part of a small team to design and implement the new system.

The successful applicant must:

1. Be used to dealing with staff at Senior level.
2. Be self-motivated and used to working within firm budgets and time scales.
3. Have experience of RSTS and BASIC + Have a working knowledge of financial and stock control systems.
4. Ideally have worked in the distributive industry.

Besides an excellent salary, we offer an attractive employment package including company car and pension scheme. There are good long term prospects for career progression within the Data Processing Division of the Sankey Group.

Applications, in confidence, giving details of background and experience should be sent to:

E. A. W. Smith, Group Personnel Director
J. H. Sankey & Son Ltd.
Head Office, Station House, Harrow Road
Wembley, Middlesex HA9 6DB

SANKEY
THE BUILDERS MERCHANT

OPPORTUNITIES IN ABERDEEN

The following vacancies have arisen at Grampian Health Board's modern computing centre in Westburn Road, Aberdeen.

SENIOR SYSTEMS DESIGNER

Salary circa £2312-£2765 (plus pay award due January 1, 1980).

To take responsibility for the development of a Hospital Administration System linking to a Resource Management System (using a DBMS) and a Patient Index.

SENIOR PROGRAMMER/ANALYST

Salary circa £2253-£2688 (plus pay award due January 1, 1980).

To take responsibility for the efficient running of financial and other systems, including user liaison, on an ICL 2904.

PROGRAMMER/ANALYST

Salary circa £2040-£2572 (plus pay award due January 1, 1980).

To be involved in programming for the Hospital Administration on a microprocessor system, and the Patient Index System on ICL 2904.

Candidates with insufficient experience for this post may be appointed but on a lower scale.

Grampian are developing a network of communicating machines, the main ones being two ICL 2904's (programmed in COBOL) and a CTL Mod 1 (programmed in FORTRAN and using a Coddasy database management system). Links to another ICL 2903 and a microprocessor exist, and further links are being developed to Orkney and Shetland. Use is also made of the Aberdeen University's Honeywell Level 88. Further information concerning these posts may be obtained from Ken Allen, phone 0224-681818, Ext. 2977.

Application form and further details may be obtained from: The Area Personnel Officer, Grampian Health Board, 1 Albany Place, ABERDEEN, to whom completed applications should be returned by August 31, 1979.

DUNDEE COLLEGE OF TECHNOLOGY

LECTURESHIP IN COMPUTING (TWO POSTS)

The successful applicants will be capable of teaching at degree level and have specialist interests in one or more of the following areas:

computer science; systems software; computer architecture and micro-computers.

Salary: Lectureship (A) scale: £4422-£7812 (bar) - £8281 with initial placing, depending upon approved previous experience.

Further particulars and application forms may be obtained from the Administrative Assistant (Establishment), Dundee College of Technology, Bell Street, Dundee, DD1 1HG, with whom applications should be lodged not later than September 7, 1979.

UNIVERSITY OF YORK

Department of Computer Science SRC CASE RESEARCH STUDENTSHIP

The Department is conducting research into real-time computer systems involving data acquisition, transmission and processing.

Applications are invited from candidates with a good honours degree in engineering or science who wish to research in the area of

COMPUTER ASSISTED TECHNIQUES IN FIBRES PRODUCTION

It is proposed to investigate how a computer coupled to a closed circuit television system might be used to monitor the quality of production of synthetic fibre yarns and fabrics. This is a collaborative project with ICI, Fibres Division at Harrogate.

The successful candidate will be expected to register for a higher degree. The SRC CASE award is tenable for three years and the value in the 1979/80 year is £1820 p.a. (tax free); this will be supplemented by a grant of up to £735 p.a. (tax free) provided by ICI. The level of supplementation will be determined by the qualifications and experience of the candidate appointed. Applications from undergraduates in their final year of study will be welcome.

Further details and application forms can be obtained from:

Dr A. J. Willmott
Department of Computer Science
University of York
Heslington
York YO1 5DD



London Borough of Camden

CHIEF EXECUTIVE'S DEPARTMENT

OPERATIONS CONTROLLER

Responsible to the Operations Manager for the day to day planning, organisation and control of batch processing and the provision of transaction processing facilities.

Applicants will have a strong operations background with a high level of technical expertise. The successful candidate will assign and supervise operating and data control staff and Data Creation (Inforex) and operating priorities. He/she will be expected to play a major part in the conversion from a 1900 to a 2900 system.

Salary (pay award pending) £2561-£7731 p.a. inclusive. Manager, on 01-278 4444 ext 2014 quoting reference number IC/55C/V.

For application form please telephone our 24-hour recruitment answering service 01-837 9888 or send postcard to the Chief Executive, London Borough of Camden, Town Hall, Euston Road, London NW1 2RU, station post and appropriate reference number.



camden - an equal opportunity employer

Applicants are considered on the basis of their suitability for the post regardless of sex, race and marital status. The Council also welcomes applications from disabled persons with the necessary attributes.

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They are poised to DOUBLE T/O next year but to do this they need YOU! YOU will be selling one of the Most Advanced Multi-Processor Systems available in the market place today with an average order value in excess of £100,000.

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If YOU have a good track record in computer sales this could be for YOU. Are YOU ready?

If so, Call Now. Ref. CS 1156

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TO £8,000 PROGRAMMERS BASIC +



One or more years' of commercial programming experience, utilizing BASIC + qualifies you for consideration by our client, an industry leader in design and implementation of financial and commercial systems.

Programs are run on their PDP 11/34 operating under RSTS-E. Other hardware and operating systems experience will be considered, the key being a desire and ability to learn.

Due to recent expansion, requirements are at all experience grades including project leader, salaries being commensurate with experience.

For further information contact Alan L. Whitford

Accord Computer Efficiency Limited

Portland House
4 Great Portland Street
London W1N 5AA
Tel: 01-637 5001; 01-580 3754
Telex: 261334 ACE UK
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Computer Services Manager

c. £9,000

Marconi Space and Defence Systems Ltd., Europe's Number One company in the field of torpedo development, has a vacancy for a Computer Services Manager on the Sting Ray project at Stanmore.

The successful applicant will be responsible for controlling the two GEC 4082 digital computers and the Real Time Simulator currently being used to carry out scientific modelling and data analysis studies by our highly skilled teams of software programmers and engineers. The GEC 4082 computers are used in a multi-access mode and currently support a total of 32 on-line terminals and a simultaneous powerful batch stream facility.

The Computer Services Manager will control about 12 operations and maintenance staff who provide computing facilities to the project engineering teams over a two shift period. Besides controlling the existing system he/she will be expected to be involved in activities to improve the efficiency of the facility including the ability to liaise with the computer

manufacturers technical staff and to advise in extensions to the hardware.

Experience of organisation and management is desirable and it is unlikely that anyone under 28 would have sufficient experience.

This vacancy presents an ideal opportunity for a computer professional to work in our attractive setting in North West London's Green Belt. We offer a competitive salary (dependent on age and experience), a full range of fringe benefits including where necessary, relocation assistance.

Please write, with full details of your career to date and quoting reference ST/297, to Ray Leggett, Marconi Space and Defence Systems Ltd., The Grove, Warren Lane, Stanmore, Middlesex.

Marconi Space & Defence Systems (Stanmore)
A GEC Marconi Electronics Company

STAR JOB SPOT

DATA CONTROL SUPERVISOR / SENIOR CONTROLLER

To £7,000 C. LONDON
A large central London Service Bureau requires a Data Control Supervisor and Senior Data Controller, both positions requiring in depth OS JCL, supervisory and customer liaison experience. These senior positions need mature applicants of a high standard. If you have the right background, ring now for more details CW 32/1 TRICIA

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To c. £5,000 inc. NR. STANMORE
A super firm with super perks including mortgage assistance relocation expenses, subsidised canteen plus lunch vouchers, Non-CPS, 4 weeks' hols., free life assurance and an active S & S club wishes to recruit ICL GII and VMEB/VMEK operators with a minimum of 1 year's experience. This company uses both ICL 1900 and 2900 machines, so your working experience will be invaluable. CW 32/2 TRICIA

JUNIOR OPERATORS

c. £4,000+
Do you have 6 months' + IBM, ICL or other operating experience? Why not broaden your horizons and apply for one of our excellent junior positions in London and Home Counties areas. Promotion prospects are good, and company benefits first rate. CW 32/3 TRICIA

OPERATORS TO SHIFT LEADERS

£3,800 to £6,500 inc. NR. HAYES, MIDD.
Join one of the most advanced computer installations in the country. The latest IBM 3000 series plus other special equipment. This major commercial business offers free BUPA, CPS and many other attractive perks including full training. CW 32/4 TRICIA

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£4,000 to £5,000 SE ENGLAND
You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them. CW 32/5 TRICIA

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U.K. to £200 p.w. ICL 1900 2900 IBM 360/370 ASS. P11 OS OVERSEAS to £450 p.w. IBM ASS./FORTRAN/PLAN EUROPE/UK IBM COBOL OS NEW YORK 1 yr+ ICL 2903 COBOL/REALTIME KUWAIT 6 mths ICL 1900 GS HOLLAND 6 mths

Please ring from 01-955 4140 for Contract Details

UCL Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED
01955 3883 (01958 6138 Evenings)
Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4

Data Processing Manager

West Yorkshire...

A well-known organization requires a Data Processing Manager to be based at its head office in West Yorkshire. The Board of the company are totally committed to data processing as a key service to all operational areas of the company.

Candidates should have considerable experience in commercial data processing and be able to demonstrate a successful record of systems implementation. Previous managerial experience, preferably including responsibility for operations, is required.

The rewards will be made attractive and include a salary around £11,000 plus car, free BUPA and excellent fringe benefits. Generous relocation expenses in appropriate cases.

Please contact Ivor Norton in strict confidence, with full career details and quoting reference CW/79043.

£11,000 + CAR

Ivor Norton Management Services Ltd

RECRUITMENT CONSULTING DIVISION
52 Shaftesbury Avenue, London W1V 7DE. 01 734 8862 (24 hour answering service)
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